MODERN PLASTICS

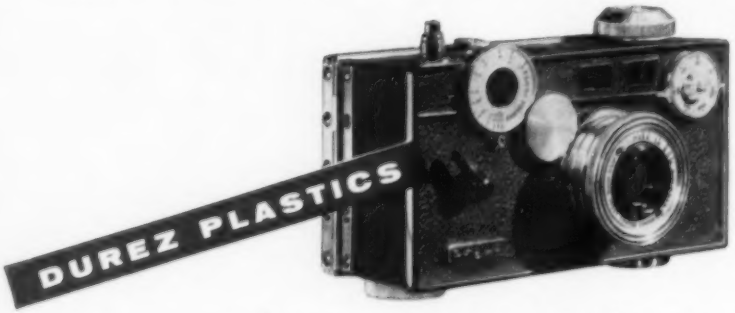
NOVEMBER 1955

Unlimited Future for POLYESTER FILM...Page 85

How to Use Reinforced PREMIXES...Page 125

THE DUAL ROLE OF

DUREZ IN INDUSTRY



make rugged cameras and parts

make stronger boat hulls

BOTH *could be profitable for your business*

If you make a product in which light weight, lustrous surfaces, impact strength, and excellent thermal, electrical, and chemical properties, or any combination of these are desirable, the phenolic *molding compounds* could be your most profitable field of inquiry. Or a phenolic *resin* may improve your product or processes when used for bonding, coating, or impregnating. For the many advantages of phenolics in any form, call on Durez experience. You'll have at your service the facilities of a leader in developing these plastics, and their largest producer. Write for our latest general bulletin.

DUREZ®

DUREZ PLASTICS DIVISION
HOOKER ELECTROCHEMICAL COMPANY
Phenolic molding materials and phenolic resins that fit the job
HOOKER CHEMICALS
1211 WALCK ROAD, NORTH TONAWANDA, N. Y.

The more *Catalin Styrene*, the merrier, Christmas!

CATALIN STYRENE, the gem of plastics, enjoys Christmas morning. . . . It thrills at being so bountifully present under America's traditionally festive tree!

Here is a molding compound that is *special*-holiday . . . gay, bright of color, rugged, versatile and spiritedly givable! Whatever the manufacturer's proffered product, the decision to mold it, entirely or in part, of CATALIN STYRENE seals the deal—with gift appeal! For proof, note the breath-taking expression on KMT's* new Christmas-day engineer!

CATALIN STYRENE is the featured material of this model railroad's car-bodies, rail ties and wayside accessories. Its use, aided by good design, precision molding, sharp detailing and true-to-color portrayal, achieves full-scale realism—and complies with Santa Claus' specifications for long-lasting *full-scale* play! *KMT Electric Trains by Kusan-Auburn, Inc., Nashville, Tenn.

CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE • NEW YORK 16, N. Y.

Catalin

In addition to Styrene Molding Compounds, Catalin chemical products include a wide range of Urea, Phenolic, Cresylic, Resorcinol, Melamine and Styrene Resin formulations

MODERN PLASTICS*

November 1955 • Vol. 33, No. 3

CONTENTS

GENERAL SECTION

Progress in Polymerization; More Molds in the Making (Editorials) 5

Mighty Beauty 85
High-strength polyester film finds increasing uses in numerous decorative and functional applications

Vinyl Sheet Gets New Backing 91
Latex-bonded non-woven fabrics make great strides as support for vinyl in automobile upholstery

Packaged in Molded Polystyrene 92
How and why more kinds of consumer products sell better when merchandised in molded polystyrene containers

Rugged Doors 98
Combining phenolic-paper honeycomb, hardboard, and vinyl-aluminum skins with a resorcinol adhesive makes lightweight yet strong institutional doors

Urea Housing, Polyethylene Case 100
Enhanced sales appeal and more efficient performance result from extensive use of plastic materials in a new exposure meter

From Design to 3D Display 101
Sheet formed displays are getting better—thanks to meticulous design and sound engineering

Furniture With a Future 104
Reinforced plastics frames are combined with foam and vinyl sheeting to produce a new concept in upholstery pieces

Have You Looked at Vinyl Dispersions Lately? .. 106
As a low-cost protective coating for metal, the plastisols and organosols continue to merit top consideration by engineers, designers, and product finishers

Small-Fry Specials 110
Designed around molded polyethylene parts, new line of low-priced toys has play value, safety, and durability

Plastics Products 112
Paint can; water skis; model kit; ice cube tray; beach balls; plant feeder; salad bowl; and car thermometer

Reinforced Plastic Shelter Quickly Erected 202

Styrene Foam Float 205

Acetate Bushings 207

Shower Enclosure 210

Acrylic Lenses 215

PLASTICS ENGINEERING

Quality Control for Custom Molders 117
by John B. Whitted, Jr.
Stripped of the symbolism of higher mathematics a plan is presented which the product engineers can readily apply to upgrade the quality of molded plastics parts

Low-Cost Molds for Short Runs 121
by A. M. Creighton, Jr.
Cast molds, composed of powdered metal and catalyzed thermosetting resin, oven cured, can be produced in a matter of hours

Reinforced Polyester Premixes 125
by W. O. Erickson and W. R. Ahrberg
How to make and mold them

TECHNICAL SECTION

Highly Filled Fibrous Glass-Reinforced Polyester Molding Compound 133
by R. F. Shannon and L. P. Biefeld

A Method for the Interpretation of Brookfield Viscosities 140
by R. L. Bowles, R. P. Davie, and W. D. Todd

Methods of Testing Modified Polystyrenes for Use in Telephone Housings 150
by Hilding Hogberg

DEPARTMENTS

Plastics Digest 158

U. S. Plastics Patents 172

New Machinery and Equipment 176

Books and Booklets 182

Production Figures 200

Manufacturers' Literature 221

Classified Advertisements 280

Index of Advertisers 286

THE PLASTISCOPE 260
News of the Industry, Predictions and Interpretations; Company News; Personal Meetings

Modern Plastics Executive and Editorial Offices: 575 Madison Ave., New York 22, N. Y.

Modern Plastics, published monthly by Breskin Publications, Inc., at Emmett St., Bristol, Conn. Modern Plastics Encyclopedia Issue published as second issue in September by Plastics Catalogue Corp., at Emmett St., Bristol, Conn. Second-class mail privileges authorized at Bristol, Conn. Modern Plastics copyright 1955 by Breskin Publications, Inc. All rights reserved. Nothing that appears in Modern Plastics may be reprinted wholly or in part without first securing special permission. Modern Plastics is regularly indexed in Industrial Arts Index and Industex. Subscription rates: U.S., its possessions, and Canada, $6.00 for one year, $11.00 for two years, $15.00 for three years; Pan-American countries, $10.00 for one year, $17.00 for two years, $24.00 for three years; all other countries $15.00 for one year, $25.00 for two years, $35.00 for three years, payable in U.S. currency. Single copies (except the September Encyclopedia Issue, which is not sold separately) $0.75 each in the United States, its possessions, and Canada; all other countries, $1.50. Printed in the U.S.A., by Hildreth Press, Inc., Bristol, Conn.

*Reg. U.S. Pat. Office.

Another new development using

B. F. Goodrich Chemical *raw materials*

B. F. Goodrich Chemical Company does not make these screens. We supply only the Geon polyvinyl material.

Geon helps happier hens boost production

ORDINARY wire mesh laying screens are often noisy, actually scare hens out of the nest. This cuts down egg production, makes neither hen nor farmer happy.

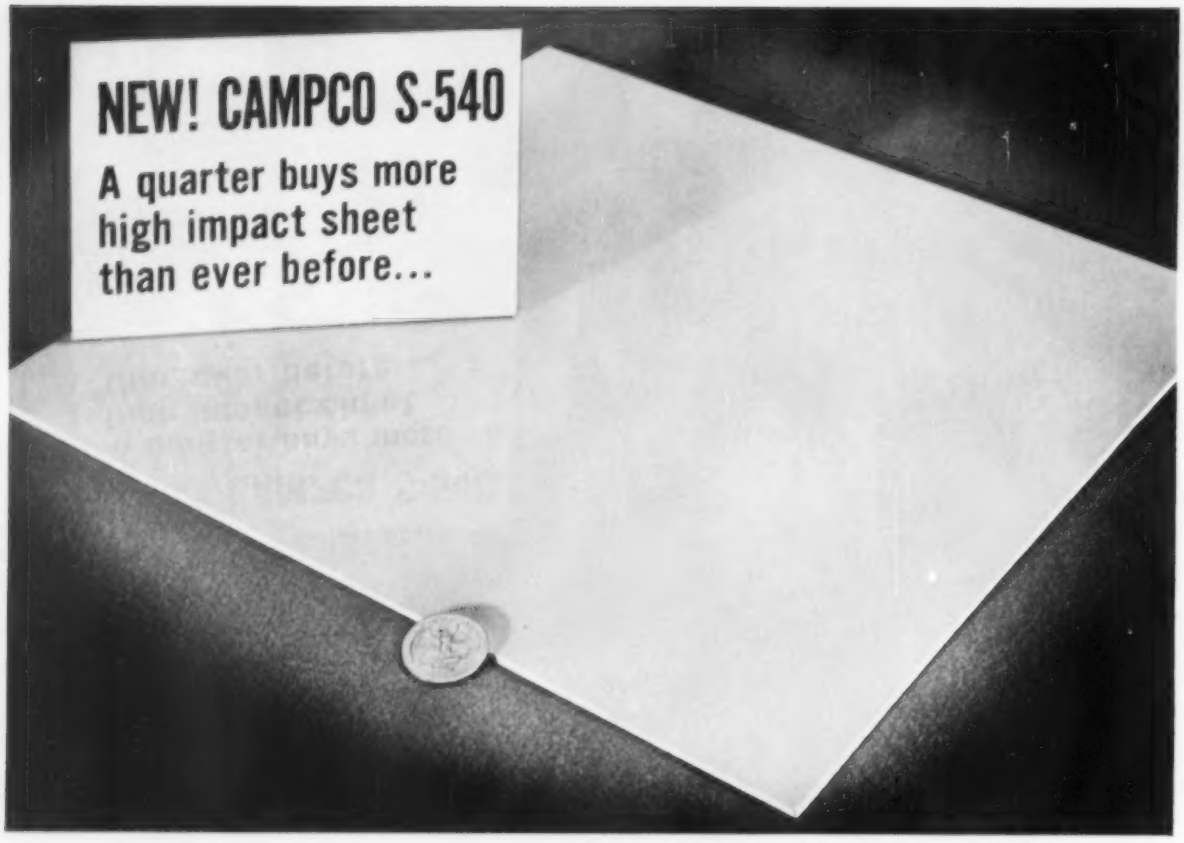
An enterprising manufacturer in Minnesota stilled the rattling screens by coating them with a plastisol made from Geon resin. The quieter screens get more production from happier hens . . . help reduce egg breakage . . . give the farmer a bonus in cleaner, ready-for-market eggs.

The Geon-coated screens stay smooth, soft, and easy-to-clean for years. Geon offers exceptional resistance to moisture, corrosion, abrasion, and aging—in farm or factory, indoors or out.

Geon-based materials can be dipped, molded, sprayed, extruded, calendered, shaped in numberless ways for limitless uses. Geon can help you develop a new product or improve an old one. For complete information, please write Department BR-11, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

GEON RESINS • GOOD-RITE PLASTICIZERS . . . the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors



...and to prove it – CAMPCO offers you a sample sheet absolutely free!

Campco S-540 is a new rubber-modified styrene sheet that's plenty tough for most high-impact applications. *Yet, it's priced low—in .080" gauge it costs only about a quarter a square foot!*

But don't take our word for its remarkable toughness – get your sample and test it right in your own shop. And, remember its low, low cost – ⅓ less than competitive sheet of really high-impact resistance.

S-540 cuts costs on high-impact applications. Toys • displays • covers • refrigerator parts • racks • trays • equipment housings • boxes • drawers • hundreds of similar parts and products. Its toughness in thin gauges, coupled with non-toxicity, makes it an excellent packaging material.

S-540 offers all these shop advantages. Can be vacuum-formed with low-cost molds • easy to print on, presents no registration problems • takes naturally to painting or printing • offered in matte, polished or high gloss GM finish, in a wide range of colors, thicknesses and dimensions • attractive porcelainlike finish improves product appearance.

S-540 has properties of high-priced sheet. Has low specific gravity • low moisture absorption • excellent tensile and flexural strength • excellent stability and non-toxicity.

Write for your sample, now — and compare S-540 with the styrene sheet you're now using!

CAMPCO Division of
Chicago Molded Products Corporation
2721 Normandy Avenue
Chicago 35, Illinois

☐ Kindly send me a sample of S-540 in the width and gauge I've indicated below.

Gauge_____ Width_____

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

CAMPCO DIVISION OF
CHICAGO MOLDED PRODUCTS CORP.
2721 Normandy Avenue
Chicago 35, Illinois

MODERN PLASTICS
575 Madison Ave., New York 22, N. Y.

PRESIDENT AND PUBLISHER
Charles A. Breskin

EXECUTIVE VICE PRESIDENT
Alan S. Cole

VICE PRESIDENT
Theodore B. Breskin

EDITOR
Hiram McCann

MANAGING EDITOR
A. Paul Peck

TECHNICAL EDITOR
Dr. Gordon M. Kline

ENGINEERING EDITOR
Fred B. Stanley

SENIOR EDITOR
R. L. Van Boskirk

MIDWESTERN EDITOR
Val Wright

ASSOCIATE EDITOR
Joel Frados

ASSISTANT MANAGING EDITOR
Sidney Gross

EDITORIAL ASSISTANT
Eve H. Marcus

RESEARCH EDITOR
Jane F. Winik

READERS SERVICE EDITOR
Paul P. Philipson

ART DIRECTOR
Donald R. Ruther

TREASURER
Ruth Tulbert

ASSISTANT GENERAL MANAGER
Philip W. Muller

CIRCULATION MANAGER
Robert B. Birnbaum

PRODUCTION DIRECTOR
Daniel M. Broads

ASSISTANT PRODUCTION DIRECTOR
Bernard J. Farina

PRODUCTION MANAGER
Renèe C. Corn

ADVERTISING OFFICES
New York 22, 575 Madison Ave.
Tel., PLaza 9-2710
Alan S. Cole, *General Manager*
P. H. Backstrom
M. A. Olsen
B. W. Gussow
S. S. Siegel
R. C. Nilson

Chicago 11, 101 E. Ontario St.
Tel., Delaware 7-0060
J. M. Connors, *Manager*
W. F. Kennedy
H. R. Friedman

Cleveland 22, 20310 Kinsman Rd.
Tel., Skyline 1-6200
R. C. Beggs, *Manager*

Los Angeles 17, 816 West Fifth St.
Tel., Mutual 8335
J. C. Galloway, *Manager*

London S. W. 1, England
Panton House, 25 Haymarket
Tel., Trafalgar 3901
T. G. Rowden, *European Manager*

Frankfurt Am Main, Germany
Wittelsbacher Allee 60
Tel., 46 143/46 372
G. J. Linder, *Manager*

Member Audit Bureau of Circulations. Member Associated Business Publications.

November • 1955

EDITORIAL

Progress in Polymerization

In the past month has come word of two relatively new developments in polymerization technology.

The first is in the use of enzymes to polymerize resins from sucrose derivatives; the second concerns photopolymerization, or the use of sunlight to create linkage in building new plastics.

These two new methods are now added to the old standard pressure-plus-heat methods, to bombardment of monomers by nuclear energy, and to polymerization by catalysts.

The more ways the chemist has to create polymers and copolymers, the greater can be his range of choice of raw materials and the greater will be the selection of polymers and copolymers he can offer. By the same token, the more kinds of plastics the chemist can make, the sounder will be the economics of competition between the various plastics, and the better all plastics will become.

Each step in this direction increases the versatility of the plastics industry and multiplies its usefulness.

More Molds in the Making

A "quickie" telephone survey of the main mold-making concerns indicates a most healthy outlook for plastics molding for the rest of this year and for the early months of next.

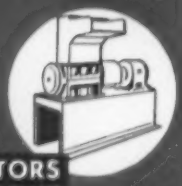
At least two companies reported a swing again to bigger molded pieces in both compression and injection work. Plastics typewriter housings are now a certainty; plastics furniture drawers and cabinet components are meeting with greatly increased acceptance, so the market requires more and bigger tools; both automotive and domestic air conditioning will offer larger opportunities for plastics in the coming year; freezer and refrigerator plastics parts continue to be a strong factor due to the terrific competition and rapid obsolesence of design; and last but far from least is the continuing swing to plastics as materials for the manufacture of large machine housings.

Molds on order for reinforced plastics molding are apparently more numerous than at any time in the past and are also bigger and better. The boat business boomed this year and the outlook for molded boats continues good; the revolution in furniture (see pp. 104-105 in this issue) presents new and rich opportunity; progress in building component design means more and bigger panel molds; and the automobile and truck body field still promises pleasant business in the future.

All the molds being ordered for delivery in the next few months are not, of course, big-cavity jobs. Automation is rapidly moving into the small-piece picture and the result will be new economies in the use of plastics. An example is a fully automatic set-up for distributor caps. Another example is in a line of small injection molded packages for which special molds for automatic operation are now being engineered.

The forward position of the mold makers is a traditional key to the outlook for the industry over the near future. Right now, things look very good indeed.

In Plastics Reducing Machinery, Look to CUMBERLAND for the COMPLETE LINE



GRANULATORS

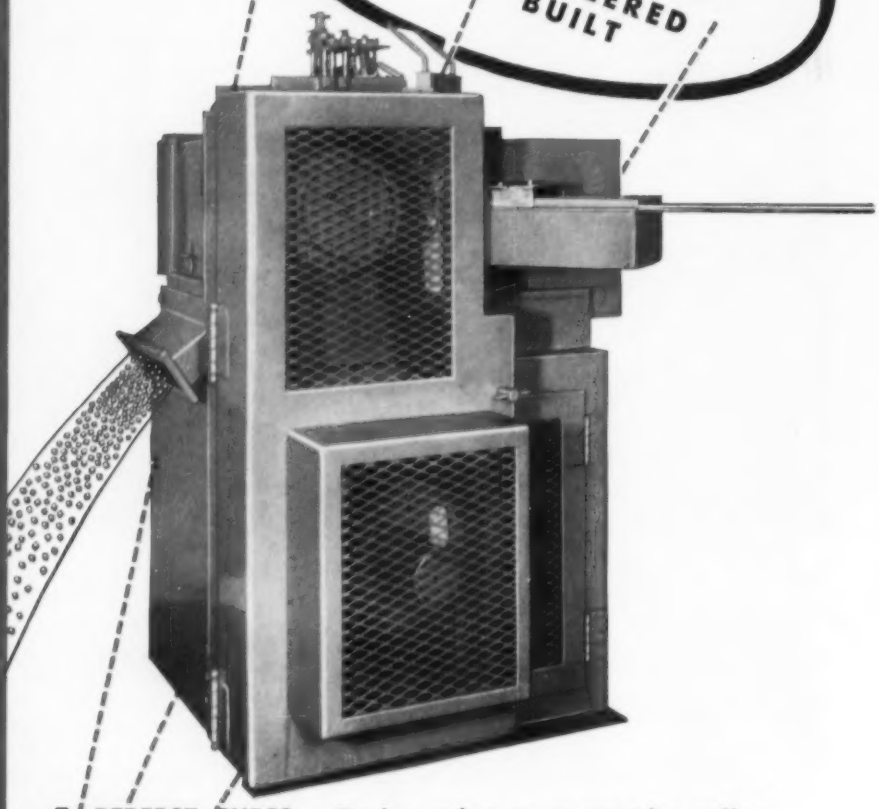
DICERS

CHOPPERS

PREBREAKERS

"STAIR-STEP" Dicing Machine

CUSTOM ENGINEERED QUALITY BUILT



1. **PERFECT CUBES** — Perfect cubes or rectangular pellets produced by simply changing knives — cube sizes from 1/16" to 1/2".
2. **DICES WIDE RANGE OF PLASTIC SHEET STOCK** — Easily handles such materials as polyethylene, soft vinyls, nylon and acetate.
3. **RUGGEDLY BUILT** — In two sizes to handle sheet stock up to 7" or 14" — Special machines built to order.

Write for complete details

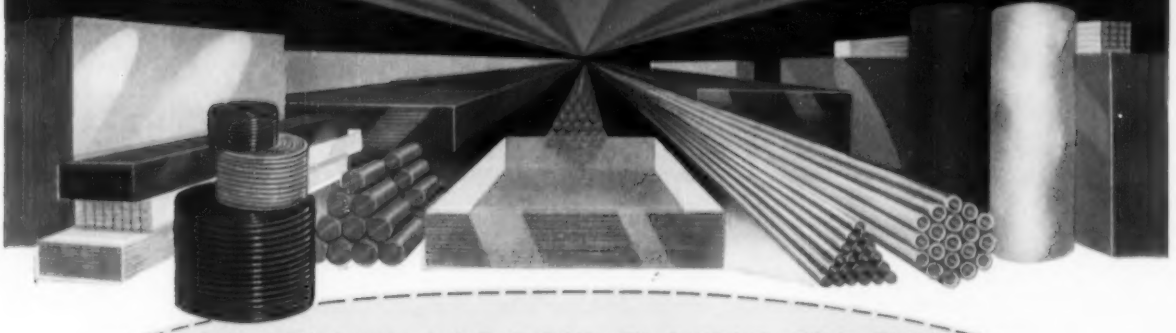
CUMBERLAND Engineering Company Inc.

BUILDERS OF BETTER MACHINES FOR THE PLASTICS INDUSTRY

DEPT. I — BOX 216 — PROVIDENCE · RHODE ISLAND

California Representative:
WEST COAST PLASTICS DISTRIBUTORS, INC.
4113 West Jefferson Blvd., Los Angeles 16, Cal.

®PLEXIGLAS
VINYLITE
ACETATE
NYLON



AMERICA'S LARGEST PLASTIC STOCKS!

ALSO MANUFACTURERS OF "CADCO" CAST ACRYLIC RODS AND TUBES

"Cadco" is available in a wide variety of transparent and lustrous colors and in diameters up to 24 inches. "Cadco" is famous for its optical clarity, strength, its ease of machining into any design, shape or form. Its almost indestructible nature gives it an unlimited range of possible applications.

® Registered Trademark Rohm Haas Co.

Now Manufacturing Cast Styrene slugs, rods and tubes.

cadillac plastic and chemical co.

15111 Second Blvd., Detroit 3, Michigan
727 Lake Street, Chicago 6, Ill.
2305 Beverly Blvd., Los Angeles 57, Calif.
2111 Olive Street, St. Louis 7, Mo.

Free Booklets! Mail this coupon to nearest office...

CADILLAC PLASTIC and CHEMICAL CO.

Gentlemen: Please send me the following free booklets

- ☐ Working with Rigid Vinyl
- ☐ 157 Ways to Use Plastics for Maintenance
- ☐ Sq. Inch to Sq. Foot Conversion Table
- ☐ How to work with Plexiglas
- ☐ Send Catalog and Prices

Name _____ Title _____

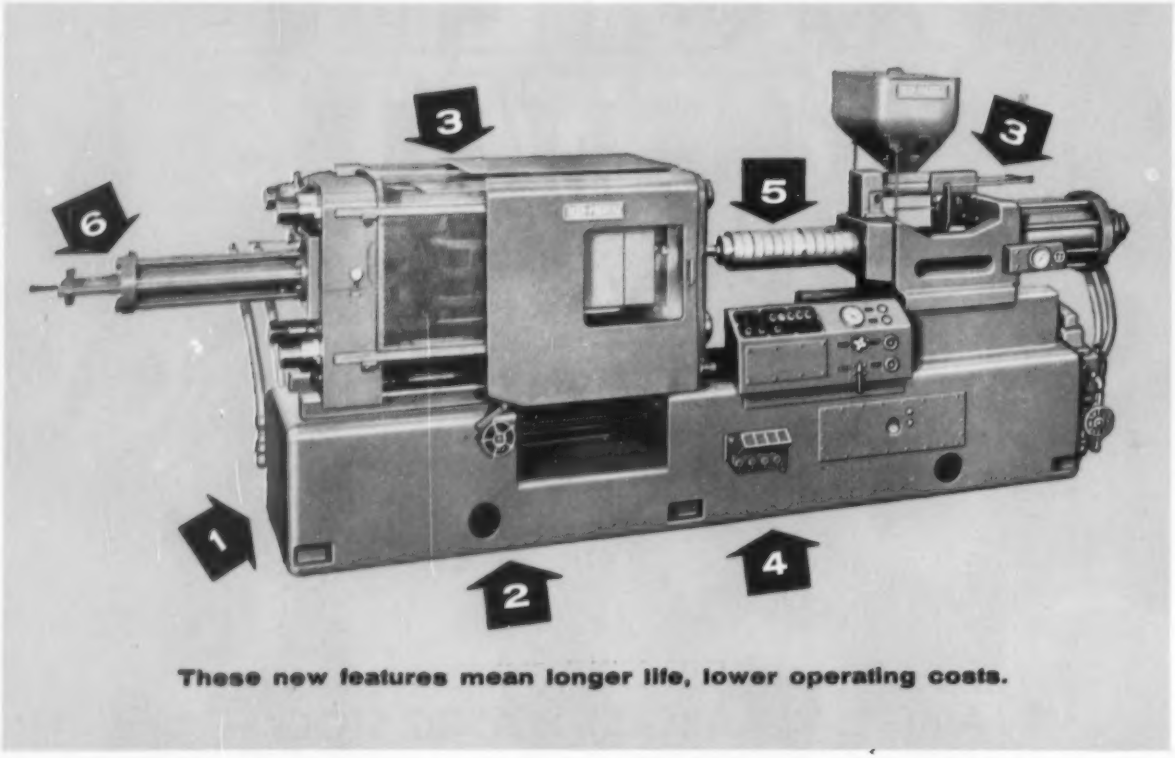
Company _____

Address _____

City _____ State _____

Now Available

THE LATEST "REED" DESIGN NEW 300TA—12/16 oz.



These new features mean longer life, lower operating costs.

Here's the newest in plastic injection molding machine design—the 300TA—12/16 oz. "REED". A product of Reed-Prentice engineering, the 300TA combines all standard "REED" advantages with these 6 big new design features:

1. Shorter, more compact—only 13'6" long, 5' wide.

2. Fabricated, one-piece steel base gives extra strength and rigidity.

3. Dual hydraulic manifolds for link and injection ends on rear of machine. This arrangement means less piping, makes hydraulic line maintenance easier and less expensive.

4. Built-in water cooling system is a standard item, offered at no extra cost. It is easily visible below the control panel, which has also been redesigned for new, read-at-a-glance convenience.

5. New "Reed-Speed" heater. 3-zone control and tapered spreader give faster, more thorough plasticizing. Change-over is quick on this new model, can be accomplished with a minimum number of shots.

6. Adjustable mold clamping stroke variable between 7½" and 12½".

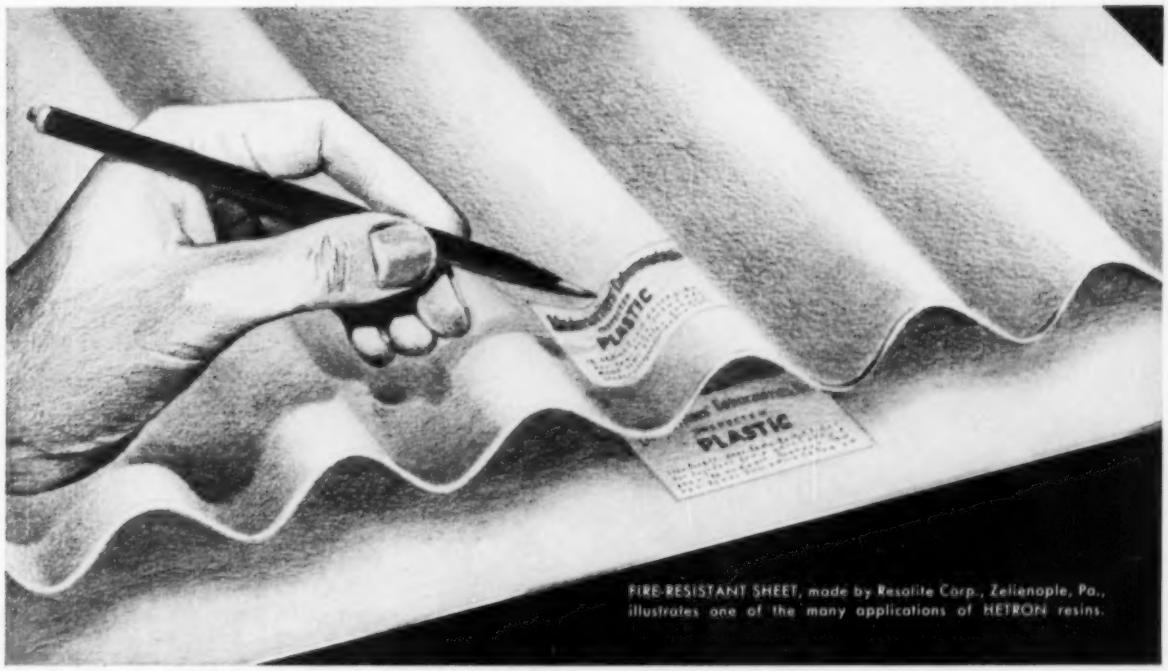
In addition to these new features, the 300TA gives you all the advantages you expect in a "REED"; 10-second dry cycling, a stuffing arrangement for extra shot capacity, large safety door and utmost operating convenience. To get complete information on the new 300TA contact your nearest Reed-Prentice sales engineer.

REED-PRENTICE

Worcester 4, Massachusetts
Affiliate of Package Machinery Company

BRANCH OFFICES: New York • Cleveland • Detroit • Chicago
Buffalo • Kansas City • Los Angeles

REPRESENTATIVES: Houston — Steel & Machine Tool Sales Co.
Seattle & Spokane — Star Machinery Co.
Minneapolis — Chas. W. Stone Co.



FIRE-RESISTANT SHEET, made by Resolite Corp., Zelienople, Pa., illustrates one of the many applications of HETRON resins.

Yes, you can get a FIRE-RESISTANT POLYESTER

And you can get it without sacrificing strength.

Read these surprising facts about* HETRON® *polyester resins

Don't rule out polyester-fibrous glass material on designs calling for a high degree of fire resistance-plus-strength.

You can in all likelihood answer the need with a HETRON-based material.

The inherent fire resistance of HETRON polyester resins make their use possible in many places where glass-reinforced polyester sheet and molded parts have not been permitted.

Light-stabilized HETRON resins now make it possible for you to attain a panel with a high degree of weathering resistance.

Will not support flame

Specific flame resistance is chemically, permanently locked into these resins. HETRON will burn only when a hot flame is applied directly to it. It "snuffs out" as soon as the flame source is removed.

Properly formulated HETRON-based sheets have shown flame spreads as low as 20 by ASTM E84-50T in exploratory tests.

No loss in strength

You do not sacrifice physical properties when you specify HETRON sheet or molded parts for fire resistance. To the contrary, tests show HETRON is *superior in physicals to most non-fire-resistant resins*, both rigid and semi-rigid. In fact, designers and fabricators have specified HETRON for its physical properties alone—with fire resistance as an added bonus.

For more complete information on HETRON, consult your current copy of Sweet's File (Product Design) or Modern Plastics Encyclopedia. For specific test results, samples of HETRON resins, and names of fabricators who can supply you with HETRON sheet and molded parts, write us today.

Comparative Physical Characteristics

HETRON and 10 non-fire-resistant resins

Physical Property		Rigid Resins		Semi-rigid Resins
		HETRON 92	Avg. 10 Others	HETRON 32 A
Flexural Strength, PSIx10³	Room Temp.	38.6	36.4	41.8
	180°F.	25.0	18.6	23.5
Flexural Modulus, PSIx10⁴	Room Temp.	1.88	1.61	1.82
	180°F.	0.90	0.79	0.85
Tensile Strength, PSIx10³		21.7	22.0	21.0
Water Absorption, Pct. by Wt.		0.13	0.29	0.13

SUPERIOR PHYSICALS of HETRON show up in exhaustive tests by independent, impartial laboratories. Panels 0.1" thick, made from HETRON and 10 leading non-fire-resistant resins, contained 35-40% glass mat, 17-20% filler, and the balance resin. Note that HETRON 32A, a semi-rigid resin, is compared with non-fire-resistant *rigid* resins.

1905—Half a Century of Chemicals
From the Salt of the Earth—1955

HOOKER ELECTROCHEMICAL COMPANY

10 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

HOOKER CHEMICALS

5-1751

ZYTEL® is being molded into assorted hospital ware that can be autoclaved, resists alcohol, alkalies and dilute acids. It won't break when dropped, is warm to the touch and its use reduces noise.

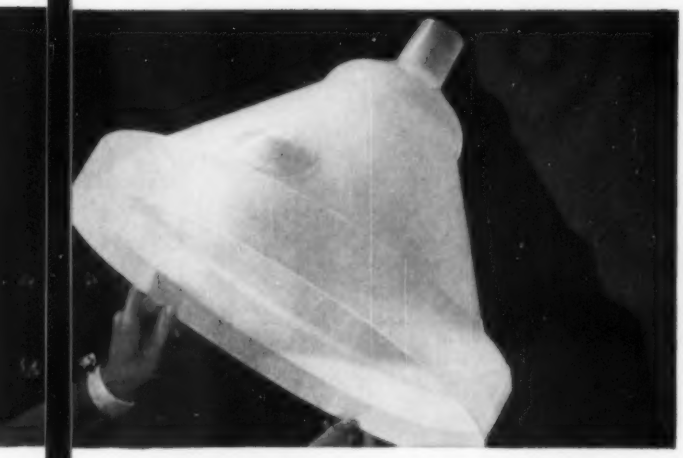
4 more examples of

Every day, new uses are being found for the Du Pont engineering materials. You may find, as others have, that you can give your product greater operating efficiency and longer life by incorporating these engineering materials into its design.

ZYTEL nylon resin is being molded into assorted hospital ware. These basins, cups, jars, tumblers, etc., can be autoclaved... sterilized with conventional cold sterilizing agents... boiled or washed in a dishwasher. They resist alcohol, alkalies and the dilute acids in general use in the hospital and medical field. "Zytel" will not crack, chip or peel and won't break if dropped. Hospital ware of "Zytel" is lightweight, but tough and rigid. It is warm to the touch, and its use reduces noise. (Molded by Zylon Products Company, Providence, Rhode Island.)

ALATHON polyethylene resin is molded into an insulation shield for the picture tube in the new RCA Victor color-TV set. When the set is operating, "Alathon" provides excellent insulation. In addition, the easily molded "Alathon" shield gives added protection to the tube when it is being shipped or handled. "Alathon" not only has excellent insulating properties, but is also strong, lightweight, flexible and corrosion-resistant. (Molded by Sinko Manufacturing Company, Chicago, Illinois.)

LUCITE acrylic resin is being used for the adjustable panels in the latest General Electric



ALATHON® provides insulation for color-TV picture tubes. It is readily molded into the complex shape required and has good dielectric properties.

LUCITE® was chosen for the adjustable panels of this new kitchen ventilator. Panels are sparkling clear, feature high impact strength and resist weather.

advanced product engineering

kitchen ventilator. These attractive, sparkling-clear panels of "Lucite" have light-transmission properties comparable to those of finest optical glass. "Lucite" is shatter-resistant. Aging, sunlight and moisture have little, if any, effect on Du Pont "Lucite."

TEFLON tetrafluoroethylene resin in porous form is being used for disk and cup filters. The filters can be used for commercial acids, caustic and organic solvents, including fuming nitric acids, aqua regia and hydrogen peroxide. It will handle all reagents, and can be chemically cleaned and sterilized. It will filter particles larger than 3 microns out of liquids, larger than one-tenth micron out of gases. (Filters manufactured by Porous Plastic Filter Company, Inc., Glen Cove, New York.)

You can get complete property information on the Du Pont engineering materials by using the coupon at right or writing to: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Room 3011 Du Pont Building, Wilmington 98, Delaware.

TEFLON® in porous form is used for cup filters. Chemically inert, "Teflon" has a working temperature that extends from −450° F. to 500° F.

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department
Room 3011, Du Pont Building, Wilmington 98, Delaware
In Canada: Du Pont Company of Canada Limited,
P. O. Box 660, Montreal, Quebec

Please send me more information on the Du Pont engineering materials checked: ☐ "Zytel"* nylon resin; ☐ "Alathon"* polyethylene resin; ☐ "Lucite"* acrylic resin; ☐ "Teflon"* tetrafluoroethylene resin. I am interested in evaluating these materials for

Name _____ *Position* _____

Firm Name _____

Street Address _____

City _____ *State* _____

Type of Business _____

**Registered trade-mark of E. I. du Pont de Nemours & Co. (Inc.)*

Prompt at your SERVICE

We carry the following plastic in stock—for all your immediate needs!

PLEXIGLAS

Standard Type II UVA
Also Type "R"—the lower priced
Acrylic sheet
Masked and Unmasked

VINYLITE

Rigid and Flexible
Clear—Colors—Calendered—Matte

CELLULOSE ACETATE

Clear—Colored—Matte—Extruded

ACETATE BUTYRATE

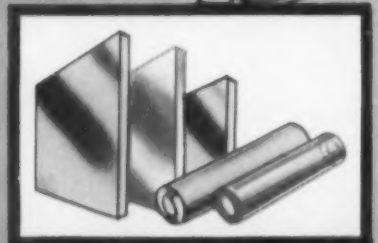
Polished—Extruded

POLYSTYRENE

Natural—Colored

POLYETHYLENE

.015 thru .125 thicknesses
Large Sheets



TRANSILWRAP COMPANY

Write for Informative Free Booklets

2814 WEST FULLERTON AVE. · Dickens 2-2616 · CHICAGO 47, ILLINOIS

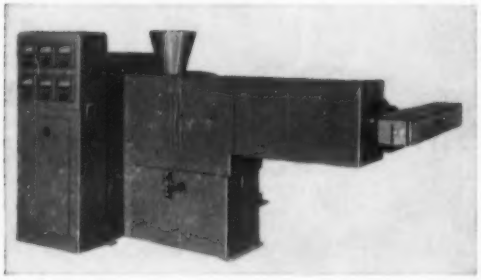
EASTERN DIVISION: 1647-40 HENVIS · Michigan 4-2241 · PHILADELPHIA 40, PA.

Traver-MPM unit for making polyethylene printable

2½" MPM extruder with seven controls and 4" tubing die

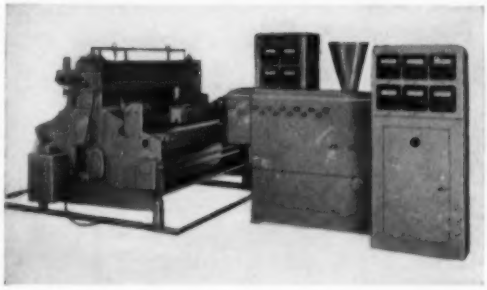
mpm

In the United States
and in 31 other countries
easy-to-use MPM machines are producing quality extrusions

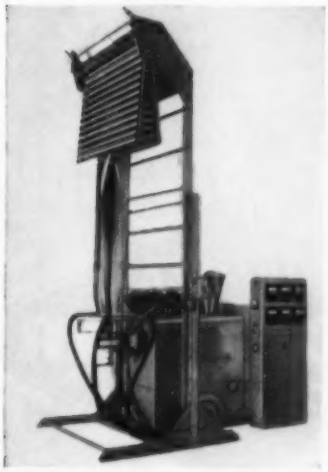


4½" MPM Extruder with a screw-to-barrel ratio of 16:1 or 20:1

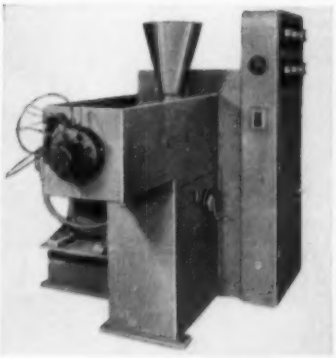
Flat sheet extrusion installation



Tubular packaging film installation on 3½" MPM extruder



2½" MPM extruder



- **Easy to install**
- **Simple to operate**
- **Rapid changeover**
- **Precise heat control**
- **High thrust capacity**
- **Corrosion resistant construction**

MPM extruders and accessory equipment are at work in factories all around the globe. Many of these machines were put into operation from instruction data supplied with our equipment, an index to the simplicity of MPM extruders. We often supply complete plants, including dies, ready to produce the customer's products.

Write to us or visit our plant for additional information on the equipment recommended for your requirements.

Write for descriptive literature

West Coast Representative:
4113 W. Jefferson St., Los Angeles 16, Calif.

modern plastic machinery corp. mpm

15 Union St., Lodi, N. J., U. S. A.
Cable Address: MODPLASEX

EXCEPTIONAL EXTRUSIONS

for expanding markets are easier made with PLIOVIC

IN 1954, more than 100,000,000 pounds of vinyl resins were consumed in the extrusion of wire coverings, hose, tubing and various profiles. And these markets are still growing! Substantial increases are predicted, particularly in the automotive and electrical industries.

Here is a suggestion: If you are interested in entering or increasing your participation in any market for extruded products, try PLIOVIC—the easy-processing polyvinyl chloride resins. In the growing and constantly improving family of PLIOVIC resins, there is almost certain to be one type especially suited to your equipment or your product.

Whether you wet or dry blend, whether you extrude at high or moderate temperatures, whether you require an electrical grade or general purpose resin, whether your product is clear, translucent or opaque, flexible or semi-rigid, there is a PLIOVIC resin you can use to advantage.

High bulk densities, uniformity, free-flowing premixes, ready extrudability, unusual heat and light stability, excellent electrical properties—in addition to above-average physical properties—are just some of the benefits offered by the PLIOVIC resins.

Why not learn more about the exceptional extrusions you can produce—easier and more economically—with tailored-to-use PLIOVIC resins? Details and samples plus technical help are yours by dropping a note outlining your needs to:

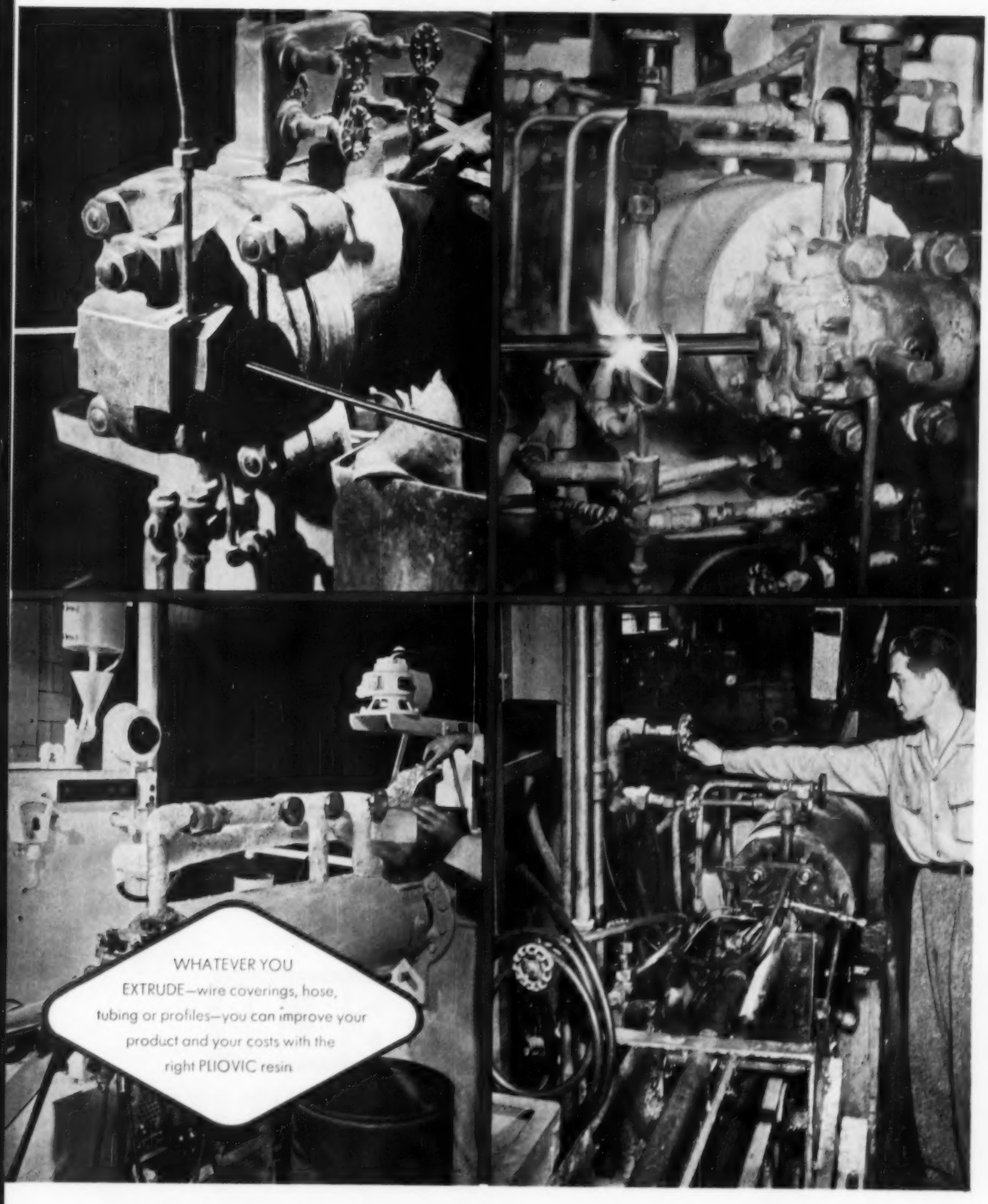
Goodyear, Chemical Division,
Plastics Dept., Akron 16, Ohio

CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Plioflex, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

The Finest Chemicals for Industry — CHEMIGUM • PLIOBOND • PLIOFLEX • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS

PLIOVIC...another quality product of Goodyear Chemical Division


WHATEVER YOU
EXTRUDE—wire coverings, hose,
tubing or profiles—you can improve your
product and your costs with the
right PLIOVIC resin

Time call

FOR
FULLY AUTOMATIC
PRODUCTION

reliable, uniformity of cycle dictated by machine, labor and operating costs cut to lowest levels

therefore

BATTENFELD

FULLY AUTOMATIC INJECTION MOULDING MACHINES

1/2 to 50 ozs. capacity

BATTENFELD MASCHINENFABRIK **MEINERZHAGEN i. WESTF.**
Germany

Woodman, Spare that tree-

There's More Money in K-K Molded Plastic Frames

Up to now, most screen frames were made of wood—probably just because they always have been. And they got dirty, splintered, and warped—spoiling work and profits both.

So Tipp Supply Company of Tipp City, Ohio, asked if we could produce them in plastics. Result: a flat, strong, adjustable phenolic frame with amazing life; that's solvent- and ink-resistant; with molded-in grooves that won't splinter or spread. And, although the speed-hungry printers find that it gives greater accuracy and higher output, it's competitively priced. Orders are pouring in like homing pigeons.

So maybe *you* don't make silk screen frames. Do you have products or parts that might be better and cheaper in plastics? CAN YOU BE SURE TILL YOU'VE TALKED TO A CUSTOM MOLDER?

We've been giving the right answers to American industry for years. Call us and be *sure*.

KURZ-KASCH

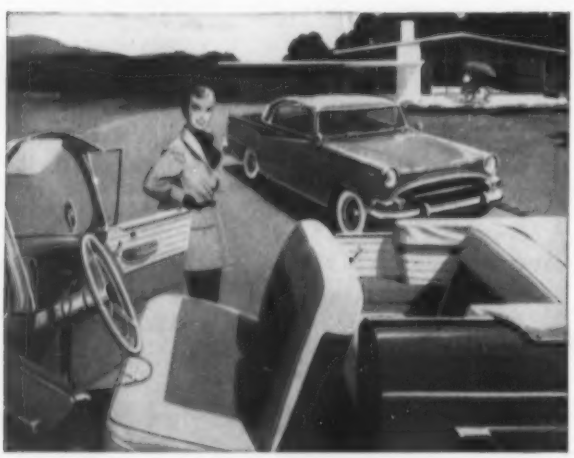
Specialists in Thermo-Setting Plastics for 37 years

Kurz-Kasch, Inc. • 1415 S. Broadway • Dayton 1, Ohio

BRANCH SALES OFFICES: New York, *Mt. Vernon MO 4-4866* Rochester, *Hillside 0626* • Chicago, *Merrimac 7-1830* • Detroit, *Jordan 6-0743* • Philadelphia, *Hilltop 6-6472* • Dallas, *Logan 5234* • San Gabriel *Atlantic 7-9633* • St. Louis, *Parkview 5-9577* • Atlanta, *Exchange 5516* • Toronto, *Riverdale 3511*.

WELKOTE—Wellington Sears nylon backing fabric, when neoprene or vinyl-coated, combines light weight plus strength for a multitude of protective covering uses. Besides all-weather hatch tents for shiploading, these include playing field covers, machinery and freight tarpaulins, fumigation tents, etc.

Wellington Sears fabrics back up the versatility of these coated materials



For coated auto and furniture upholstery, luggage, handbags, wall coverings and many other end uses, Wellington Sears backing fabrics include cotton sheetings and drills, twills, sateens and ducks; spun rayon, "Welkote" filament nylon and other synthetics; "KnitKote" cotton knit fabric; "Lantuck" and "Lantuck-NR" (nylon-rayon) non-woven fabrics. All end-use "engineered."

American industry today is setting no limits to the possible uses of coated materials. And there's more to these materials than meets the eye. Beneath the colorful and serviceable surface, there is a backing fabric that provides the basic strength.

But there's still more to this "inside" story. Because of special problems of tear-strength, durability, flexing, weather resistance, tailoring qualities, adhesion and the like, this backing fabric must be carefully *engineered* for each type of application.

This is where Wellington Sears enters the picture. Nowhere else will you be able to match our many decades of experience with fabrics of this type. And nowhere else will you find such a complete range of different base fabrics for every conceivable plastic and rubber coating use.

Wellington Sears makes the backing fabric only—not the finished coated product. So, if you have a coating problem—or any problem that involves fabric in combination with rubber or plastics—let our experience go to work for you. For booklet, "Modern Textiles For Industry," address Dept. K11.

Wellington Sears

A Subsidiary of West Point Manufacturing Company

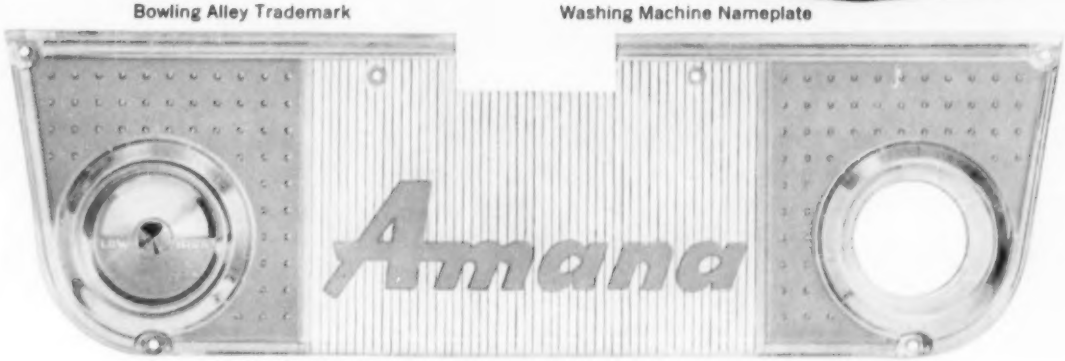
FIRST in Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

Water Heater Nameplate

Bowling Alley Trademark

Washing Machine Nameplate



Freezer Control Panel

Plexiglas . . . sales aid for fine products

Look at the molded parts above. Look around you. Notice how PLEXIGLAS acrylic plastic is used for moldings that combine beauty and function on many of the fine products you see and use every day. There's proven sales appeal in this modern way to sign your name.

The water-white transparency of PLEXIGLAS gives depth and brilliance to back-surface paints and metallized coatings. Colored moldings stay fresh and bright for years. PLEXIGLAS is tough, has outstanding resistance to breakage, weather and corrosion.

You find PLEXIGLAS molding powder used for trademarks, nameplates and control knobs on all types of home appliances and communication equipment; tail lights, instrument panels and decorative parts on cars; transparent industrial valves; outdoor lighting fixtures; optical equipment; heels on women's shoes. Our brochure, "Molding Powder Product Design", will tell you how and where to use PLEXIGLAS to make *your* products more serviceable and saleable. Send for your copy, today.

PLEXIGLAS is a trademark, Reg. U.S. Pat. Off. and in other principal countries in the Western Hemisphere.

Chemicals for Industry

ROHM & HAAS COMPANY

Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries

Canadian Distributor: Crystal Glass & Plastics, Ltd., 150 Queen's Quay at Jarvis St., Toronto, Ontario.

Have you tried

CONOCO H-340

as a secondary plasticizer for polyvinyl chloride formulations

Outstanding features of Conoco H-340 when used in polyvinyl chloride formulations are:

- **Excellent light stability**
- **Improved low-temperature flexibility**
- **Economical—unequalled advantages for cost-wise formulators**
- **Significantly lower initial and aged viscosity in plastisols**
- **Tensile and hardness properties are not materially affected**

Conoco H-340 is an almost water-white liquid having a viscosity of about 20 centipoises at 100°F. It is readily available in commercial quantities in either drums or tank cars.

We will be glad to give you further information and samples. Send us your request on your company's letterhead.

Petrochemical know-how from the ground Up!

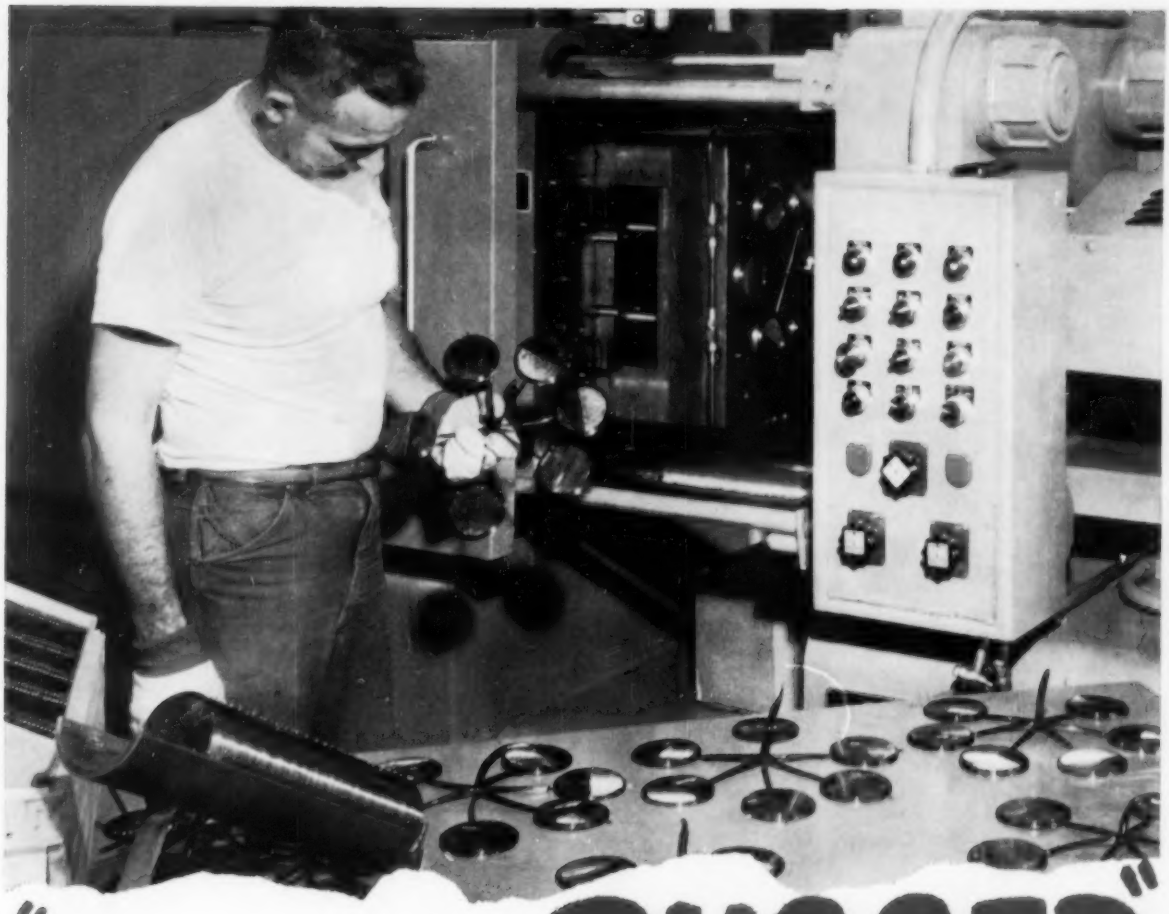
© 1955, Continental Oil Company

CONTINENTAL OIL COMPANY

Petrochemical Department, Division P-11

630 Fifth Avenue, New York 20, N. Y.

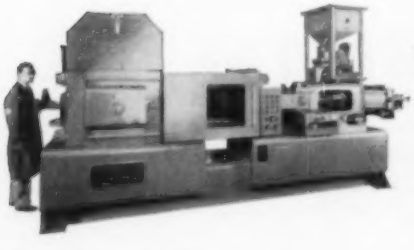
1353 No. North Branch Street, Chicago, Ill.



"We wanted it RUGGED"

"H-P-M 12 oz. Far Exceeds Expectations for Fast Mold Fill." "We wanted a rugged machine that would fill the mold rapidly and hold to close tolerances. The results with our H-P-M 12 oz. were far beyond our expectations in comparison with other machines of the same rated capacity. Although we believe we are getting the fastest cycle time possible on this particular part, our greatest saving is in the quality of the product. Rejects are not a factor now and the candlepower rating of this reflex lens has been increased."

This typical expression from an H-P-M user comes from Anthes Force Oiler Co., Fort Madison, Iowa. Little more can be added to tell the H-P-M story. For rugged dependability, fast mold closing and filling, reliable all-hydraulic operation, and quality production . . . check the world's most complete line of plastic molding machines. Call for an H-P-M engineer today.



THE HYDRAULIC PRESS MANUFACTURING CO.

1010 MARION ROAD, MT. GILEAD, OHIO

12-18 oz. H-P-M Plastic Injection Molding Machine.

HPM

NEW R/M ASBESTOS FELT PROVIDES HIGH IMPACT AND BURST STRENGTH

R/M Style 9524 is a carded blend of long crude and long spinning ferrous-type fibers, combined with an open weave glass cloth. It was designed for applications where toughness, durability, or improved resistance to resin crazing is desired. With its use, high burst and leak pressures can be obtained in tubular structures, and resistance to weepage in such items as water and fuel tanks, pipes, etc. The impact strength of R/M Style 9524 is superior, and its wet strength abnormally good, sufficient for easy handling under the most adverse conditions.

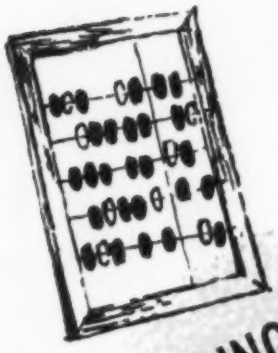
Write on your company letterhead for free copy of this brochure, containing technical and design data on R/M's unique line of Asbestos Cloths, Pyrotex Felts, and Novabestos® Papers.

RAYBESTOS-MANHATTAN, INC.

ASBESTOS TEXTILE DIVISION, Manheim, Pa.

FACTORIES: Manheim, Pa. • Bridgeport, Conn. • No. Charleston, S.C. • Passaic, N.J. • Neenah, Wis. • Crawfordsville, Ind. • Peterborough, Ont., Canada

RAYBESTOS-MANHATTAN, INC., Asbestos Textiles • Abrasive and Diamond Wheels • Packings • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Rubber Covered Equipment • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Bowling Balls



ADDING MACHINES

. . . on the go with Plenco

Whether for the amazing abacus or super accurate electronic office calculators, it amounts to the same thing—modern industry is using more high quality phenolic plastics every day—and every day more users of quality phenolics are turning to Plenco.

Plenco today plays a vital role in the Plastics Industry. Its vast experience and "*on the go*" program of research, testing and special services are paying handsome dividends in reduced production costs.

There is a Plenco phenolic molding compound or resin to meet your production problem.

Closely controlled for better molding...

PLENCO #348

A highly versatile, general purpose material designed for cabinets and cases where exceptionally glossy, clean surfaces are required. Fast cure, ease of molding, high dielectric strength and smooth, jet-black finish with minimum lubrication bloom make this material ideally suited for office equipment housings, radios, etc. For complete information concerning Plenco 348 or one of the many other Plenco phenolic molding compounds or resins write or call.

PLENCO PHENOLICS
FOR BETTER PLASTIC PRODUCTS

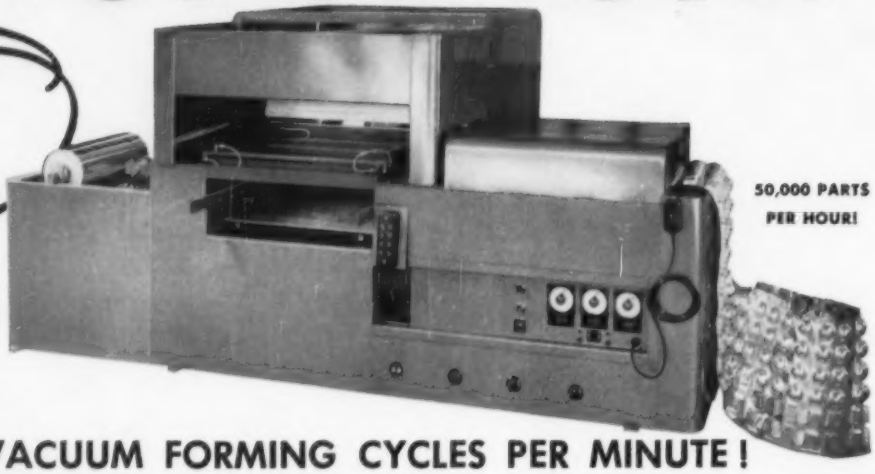
PLASTICS ENGINEERING COMPANY
Sheboygan, Wisconsin

Serving the plastics industry in the manufacture of high grade phenolic molding compounds, industrial resins and coating resins.

first with AUTOMATION!

ROLL-VAC 22

COMPLETELY AUTOMATIC ROLL-FEED



50,000 PARTS PER HOUR!

3 FULL VACUUM FORMING CYCLES PER MINUTE!

Introducing the new ROLL-VAC-22, an all purpose drape and vacuum forming machine, capable of 3-4 complete forming cycles per minute. The continuous roll-feed uses standard rolls (up to 22" wide) of Acetate, Butyrate, Vinyl, Polystyrene, and others. All of these outstanding Auto-Vac developments, proven in the standard machines, are built into the new ROLL-VAC-22 – plus complete automation.

No operator is needed once the machine is set up and started. Die-cutting, filling or packaging operation can be synchronized into a continuous production line.

Where more versatility is required—where complex or larger shapes are to be formed—Auto-Vac vacuum forming machines are the obvious choice. They are the most advanced machines available.

Exclusive features include—automatic high-speed cooling for faster cycling • fully adjustable clamping frame, available with adjustable temperature control • lowest consumption uniform Hi-temp Calrod heater unit • heavy duty synchronized toggle action drape mechanism • adjustable drape frame height.

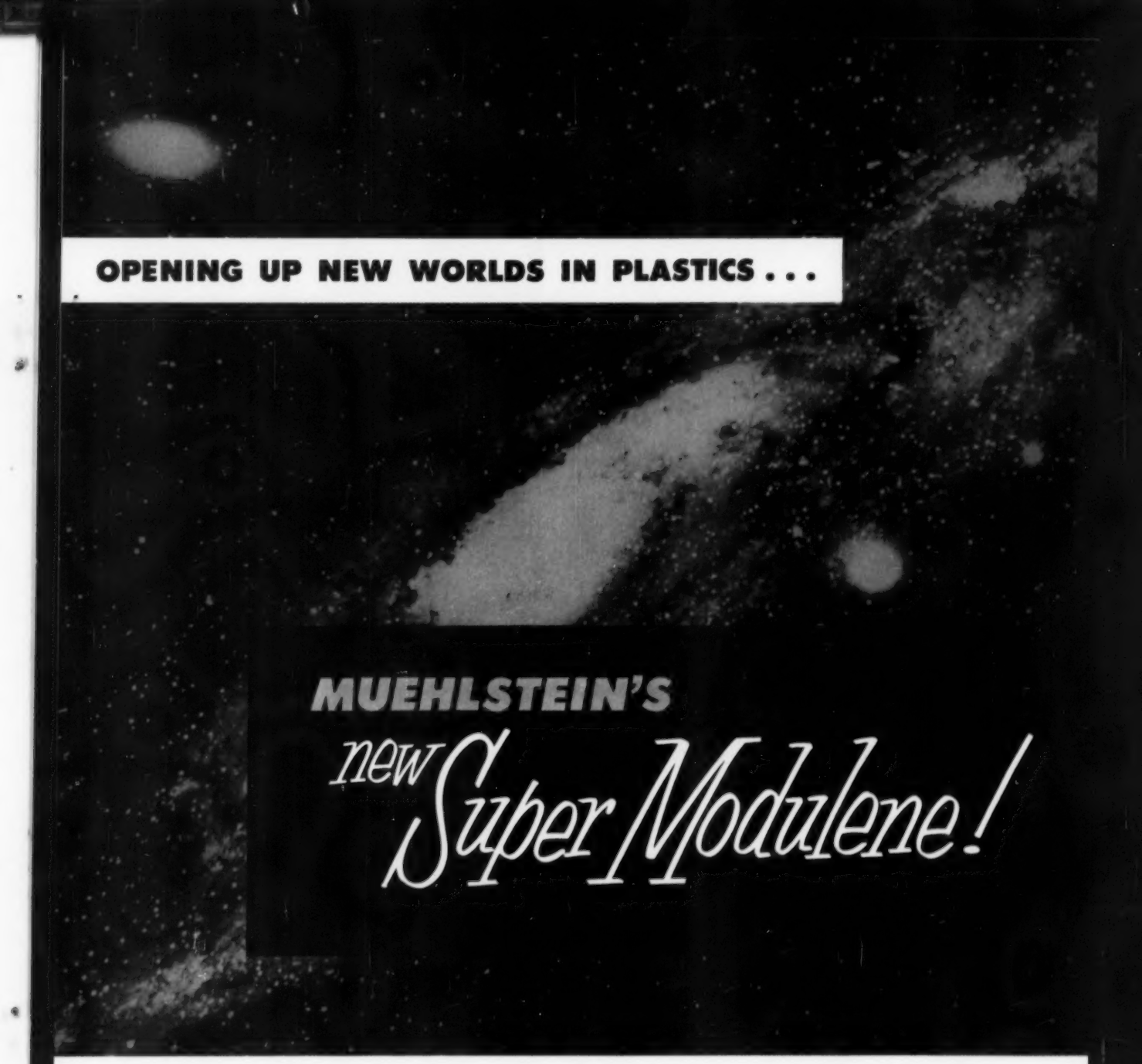
Auto-Vac machines are delivered fully equipped, complete units, ready to go to work. To help you establish and maintain the highest level of production, Auto-Vac will train your personnel at its own plant.

Pioneers!

Pioneers in the development and manufacture of the most advanced vacuum forming machines in the world.

Write today for further information and BULLETIN 55, which gives full information about Auto-Vac's standard drape and vacuum forming machines.

AUTO-VAC Company 1904 STATE STREET EXTENSION • BRIDGEPORT, CONNECTICUT • EDison 4-9481



OPENING UP NEW WORLDS IN PLASTICS . . .

MUEHLSTEIN'S *new Super Modulene!*

AMAZING, NEW HIGH MODULUS POLYETHYLENE* OFFERS GREATER HEAT TOLERANCE, TOUGHNESS, RIGIDITY AND CHEMICAL RESISTANCE.

You'll find this new, easy-to-process Thermoplastic truly remarkable. *Super Modulene* can be cooked at 250°F with only 2 to 4% dimensional change and with no loss of surface finish. In exhaustive tests it withstood blows of 32 foot pounds per inch at a temperature of –78°F. In pipe form it holds pressures of 1,000psi.

Washing machine agitators, steering wheels and air conditioner parts are just a few of the hundreds of applications of revolutionary new *Super Modulene.*

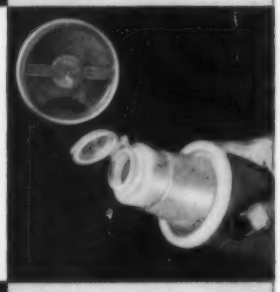
Why not improve the quality of *your* products with amazing new *Super Modulene?* Investigate the possibilities of *Super Modulene* today!

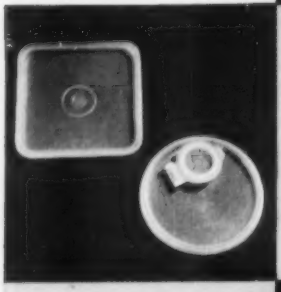
**Manufactured by Koppers Company, Inc.*

H. MUEHLSTEIN & CO.
60 East 42nd Street,
New York 17, N. Y.

REGIONAL OFFICES: AKRON · CHICAGO · BOSTON · LOS ANGELES · TORONTO · LONDON
WAREHOUSES: AKRON · CHICAGO · BOSTON · LOS ANGELES · JERSEY CITY

NOBODY HAS AS MUCH EXPERIENCE AT MOLDING POLYETHYLENE AS TUPPER!





Tupper Seals are air and liquid-tight flexible covers. The famous Pour All and Por Top covers are designed for easy dispensing. They are made in sizes to fit all Tupperware containers.

When equipped with Tupper Seals, Tupper Canisters, Sauce Dishes, Wonder Bowls, Cereal Bowls and Funnels in various sizes are the most versatile reusable containers you have ever seen.

The logical molder for you to consult regarding that product or package of yours which is to be made of polyethylene is Tupper. Tupper has done more than any other molder to make molded polyethylene a practical reality.

Aside from having designed, patented, and promoted successful seals, closures, and dispensers for polyethylene containers, the Tupper Corporation has vast experience in *every phase* of polyethylene packaging and polyethylene injection molding. This experience will be of major importance in improving your product, in reducing your costs, when Tupper goes to work for you.

Tupper's combination of experience, technical ingenuity, and the most modern equipment is at your service for the custom molding of your product in polyethylene. You can do no better than the best ... and the best at molding polyethylene is Tupper!

TUPPER!
TRADE MARK

TUPPER PRODUCTS ARE FULLY PROTECTED

About 150 United States and foreign patents and patents applied for, plus numerous trademarks and copyrights, cover the design and manufacture of the various types of Tupper Seals and other Tupper Products. Unauthorized manufacture of items covered by Tupper patents will subject infringers to prosecution.

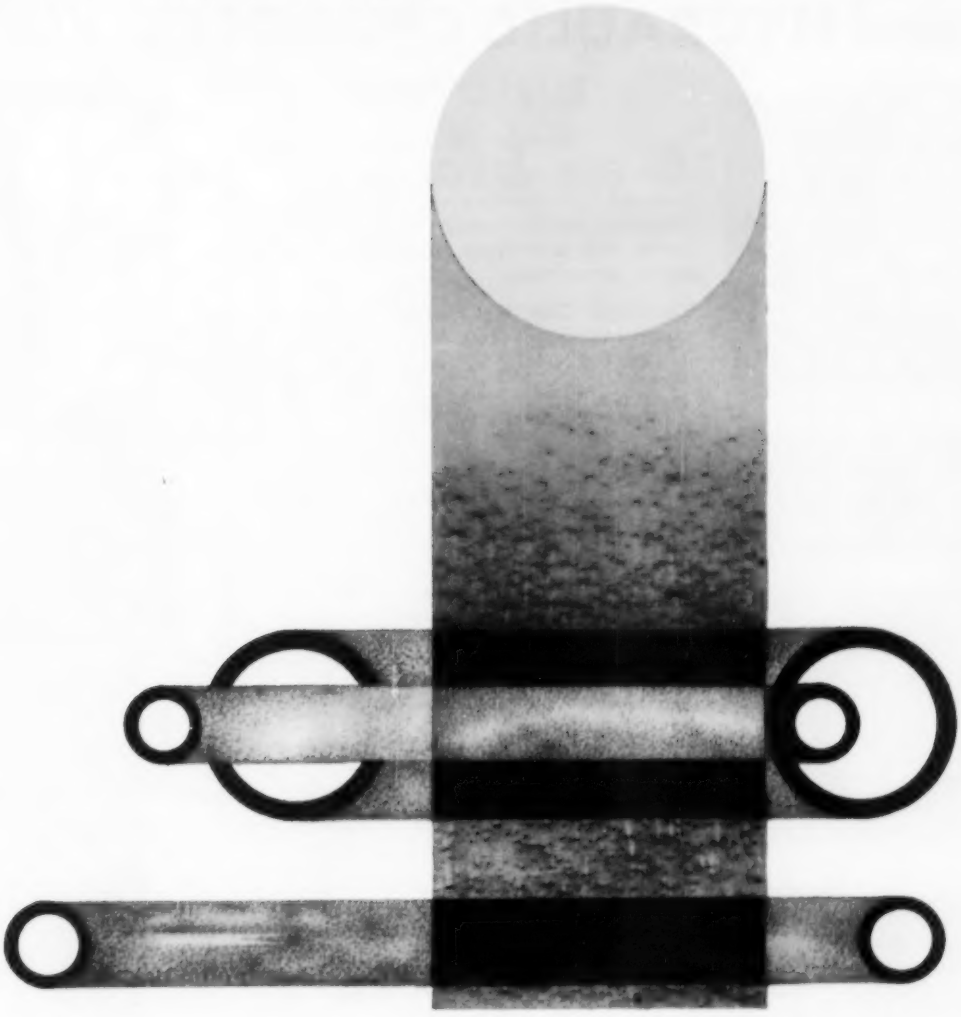
TUPPER CORPORATION

Manufacturers of — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS

Factories, Laboratories and Sales Offices: Blackstone, Mass., Farmumville, Mass., Woonsocket, R.I., Orlando, Fla., Montreal, P.Q.
Showrooms: 225 Fifth Ave., N. Y. C.

Address All Communications To: Dept. M-11

Why does man use color



PROTECTION OF POLYETHYLENE PIPE

Colors . . . pigments . . . have been used for thousands of years to protect exposed surfaces against deterioration. Recently, research has revealed that a pigment . . . carbon black . . . is the only effective agent for protecting plastic pipe against light degradation.

The black, at a particle size of 25 millimicrons maximum, must be thoroughly dispersed in polyethylene for best screening. Acheson produces dispersions of carbon black in polyethylene that meet the exacting requirements of the plastic pipe industry.

Acheson Dispersed Pigments Co., 2250 E. Ontario St., Philadelphia 34, Pa.
West Coast Distributor: B. E. Dougherty Co., Los Angeles 21, California
In Europe: Acheson Colloids Limited, Slough, England

ACHESON DISPERSED PIGMENTS CO.

a unit of Acheson Industries, Inc.

DISPERSIONS FOR THE PLASTICS AND PRINTING INK INDUSTRIES

at no extra cost to you . . .

NEW Quality Features on All AIR and HYDRAULIC CYLINDERS

CASE HARDENED CHROME PLATED PISTON RODS

On all Miller Air and Hydraulic Cylinders

Benefits To You

CASE-HARDENED Piston Rods (52-54 Rockwell "C") provide practically complete protection against damage from hammer blows, wrench-dropping, mishandling, and similar occurrences.

The HARD CHROME PLATING over the case-hardened rods protects against scratch-damage and rust.

"TEFLON" WIPERS

On all Miller Air and Hydraulic Cylinders

Benefits To You

"TEFLON" Rod Wipers and "TEFLON" Hydraulic Seals withstand temperatures from —100° F. up to 500° F. They are impervious to practically all known chemicals, including the fire-resistant, special, and standard hydraulic fluids in current use.

"TEFLON" HYDRAULIC ROD SEALS

On all Miller Hydraulic Cylinders only

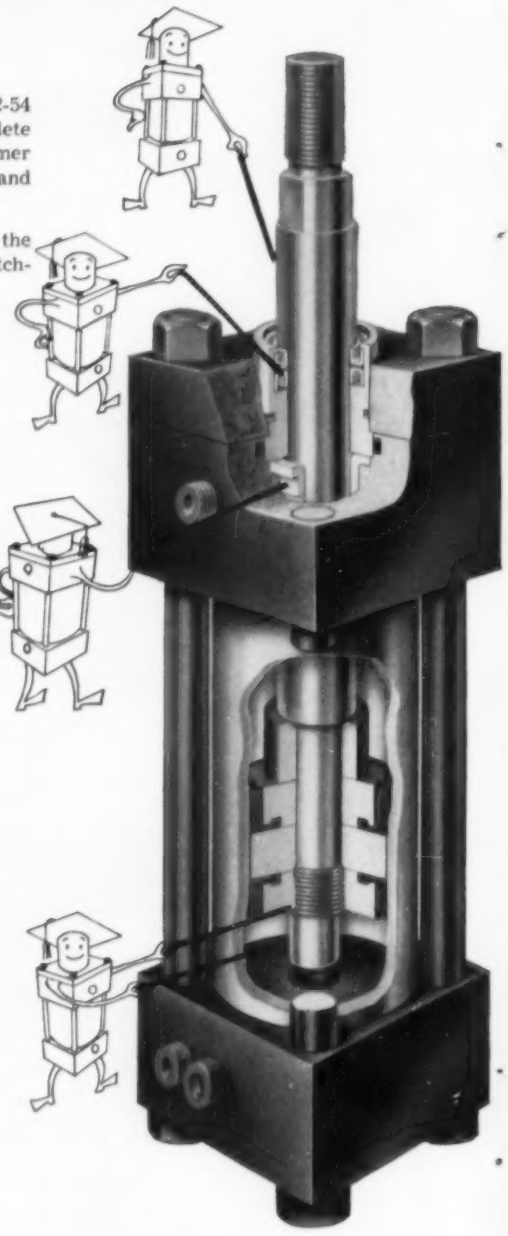
RUST RESISTANT SURFACES

On all Miller Air and Hydraulic Cylinders

Benefits To You

Highest quality Black Ferric Oxide Finish provides rust protection in air cylinder operation and on all cylinders during shipping and installation.

Cylinder heads, caps, mountings, pistons, followers, and the unplated portions of the piston rods have this finish. It is not recommended for water service.



WRITE FOR CYLINDER BULLETINS H-104 and A-105

Complete Miller cylinder line includes: air cylinders, 1½" to 20" bores, 200 PSI operation; low pressure hydraulic cylinders, 1½" to 6" bores for 500 PSI operation, 8" to 14" bores for 250 PSI; high pressure hydraulic cylinders, 1½" to 12" bores, 2000-3000 PSI operation. All mounting styles available.

Over 8,000 Different Cylinder Selections Available for Immediate Delivery. Write for Complete List.

EFFECTIVE DATES

These new Miller features will be provided at no extra cost after January 1, 1956—and at Miller's option prior to that date.

SALES AND SERVICE FROM COAST TO COAST

CLEVELAND • YOUNGSTOWN • DAYTON • TOLEDO • CINCINNATI • COLUMBUS
PITTSBURGH • PHILADELPHIA • BOSTON • HARTFORD • NEW YORK CITY
BUFFALO • ROCHESTER • MINNEAPOLIS • GRAND RAPIDS • DETROIT • FLINT
FORT WAYNE • SOUTH BEND • INDIANAPOLIS • MILWAUKEE • LOUISVILLE
KANSAS CITY • SEATTLE • LOS ANGELES • SAN FRANCISCO • BALTIMORE
DENVER • ST. LOUIS • MOLINE • CHICAGO • HOUSTON • ATLANTA
TORONTO, CANADA and OTHER AREAS

MILLER FLUID POWER CO.

2020 N. Hawthorne Ave. Melrose Park, Ill.

AIR & HYDRAULIC CYLINDERS • BOOSTERS • ACCUMULATORS
COUNTERBALANCE CYLINDERS

Suppose you were as old as Methuselah

That would make you—let's see—around 960 or 970 years old. Do you suppose, if you were that old, you would be impressed by Boonton's 35 years in business as a custom molder?

You would if you were smart, old man!

We'll admit that 970 years is a lot of hair under the beard, but the point to remember is that 35 years represents practically the entire life of the plastics industry. Away back in the "prehistoric" days of the Roaring Twenties, Boonton first got together its fine collection of designers, engineers, mold layout men, and production workers to turn out quality custom moldings. Well, these men have worked out so well that Boonton is still out in front today, despite depressions, wars, and several bald spots,

We're making fine compression and injection moldings for many old-timer customers and many new-timer customers, and they all seem to like us. Least-wise, they keep coming back. Why don't you join them?

BOONTON MOLDING CO.

BOONTON, NEW JERSEY

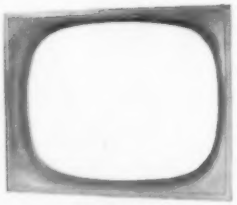
NEW YORK OFFICE—CHANIN BUILDING, 122 EAST 42ND STREET, OXFORD 7-0155

New Realism, Strength, Economy

IN MANY DIFFERENT PRODUCTS...

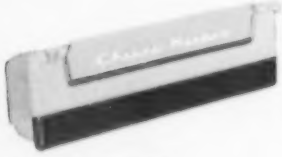
ARVIN
Radio Cabinet

Springing Horse *springs ahead* in sales. Alluring, practically indestructible "DELPHOS" Black Beauty—molded by AMOS. May be seen in leading department stores and chain stores.



CAPEHART
21" TV Mask

MITCHELL
Air Conditioner Front



PHILCO
Cheese Keeper

WESTINGHOUSE
Humidrawer

WITH AMOS ENGINEERED PLASTICS

There's always room at the top for a *good* product made *better*—with AMOS *engineered* plastics.

Sales benefits are many—improved design and styling . . . lifelike realism . . . brilliant colors all the way through . . . super strength and serviceability . . . rust-proof . . . no sharp edges to cut or scratch . . . easier, simpler, more economical finishing and assembly.

Right now is the best time to find out how AMOS *engineered* plastics can attract more customers to your product. No obligation—write, wire or phone:

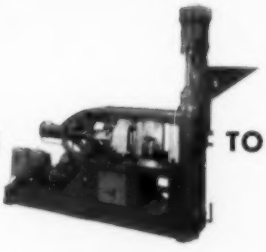
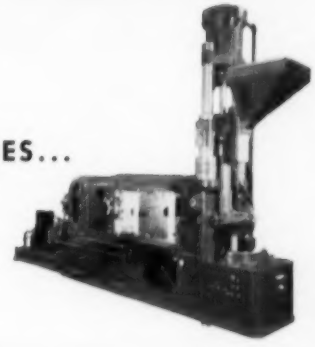
AMOS MOLDED PLASTICS • EDINBURG, INDIANA • Offices: Chicago, Detroit, Philadelphia, Kansas City, Mo., Nashua, N. H.

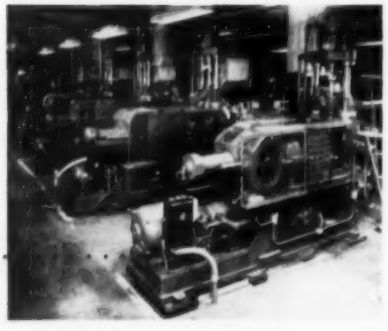
for Plastics applications...look first to Amos

Amos
MOLDED PLASTICS...
Custom Injection
Molding and Finishing Experts

IDEAL TOY CORPORATION.....

USES 21 LESTERS

RANGING FROM 8 OUNCES  TO 48 OUNCES... 

.....IN THEIR PROPRIETARY AND CUSTOM WORK..... 

● Would you like to know more about the machines used in the most successful and profitable molding installations? A word from you will bring complete details from us. And ask to be placed on the mailing list for the Lester-Phoenix house organ, "The Lester Press".

LESTER INJECTION MOLDING MACHINES

REPRESENTATIVES

New York . . . . Steven F. Krould
Detroit . . . . . M. R. Tenenbaum
Chicago . . . . . J. J. Schmidt
Cleveland . . . . . Don Williams
Coral Gables . Morton Machinery Sales
Cincinnati . . . Index Machinery Corp.
Los Angeles . . . . Machinery Sales Co.
St. Louis, Milwaukee . . . . A. B. Geers
Providence . . . . . Sydney W. Lohman

FOREIGN

Toronto, Canada A. R. Williams Mach. Co., Ltd.
Sydney, Australia . . . Scott & Hellady, Ltd.
Japan . . . . Okura & Co., New York, Inc.
Stockholm, Sweden . . . . Aktiebolaget Servus
Basle, Switzerland . . . . . Hermann Walti

distributed by LESTER-PHOENIX, INC., 2621-T CHURCH AVENUE • CLEVELAND 13, OHIO

Vacuum-Formed... Pressure-Formed

packaging

Franklin E-Z Tach Faucet Handles, by Shaw-Randall Co., Pawtucket, R. I.

puts your product in selling shape!

Vacuum-formed packaging with transparent Acetate is producing the most effective containers on store counters today.

Formed Acetate

- **is completely protective to merchandise**
- **offers full product visibility**
- **is ideal solution for multi-part products**
- **is economical**
- **will accommodate short or long runs.**

These are the solid reasons that account for the mushrooming popularity of vacuum-formed packaging.

Every day finds new applications—new selling ideas—developing from this sure-fire packaging method. If you have a packaging problem—if you are interested in getting more facts about vacuum forming, before you go ahead, get in touch with the Celanese Product Development Department. You will be given information about probable costs, and put in touch with fabricators. Use the coupon below.

Celanese Corporation of America, Plastics Division, Newark 5, N. J. Canadian affiliate, Canadian Chemical Co., Limited, Montreal, Toronto, and Vancouver.

*Reg. U. S. Pat. Off.

Celanese* PLASTICS

*Reg. U. S. Pat. Off.

Celanese Corporation of America, Plastics Division, Dept. 101-K,
290 Ferry Street, Newark 5, N. J.

☐ Send me vacuum and pressure forming information. ☐ I am interested in packaging _____ (type of product).

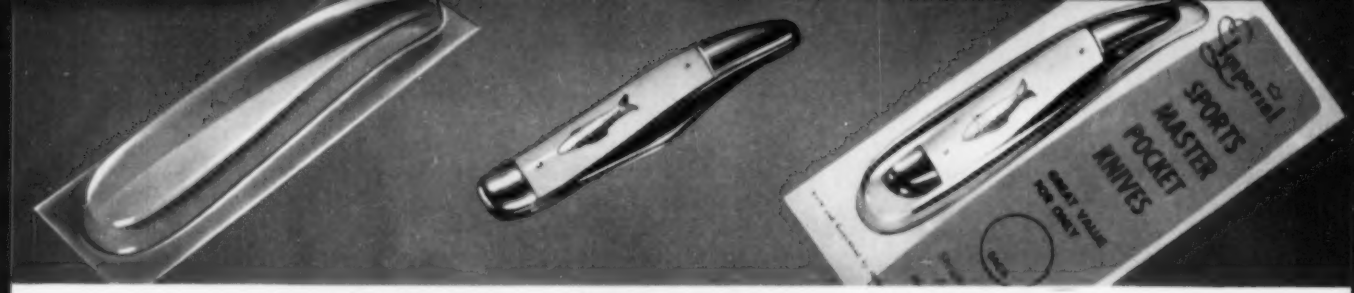
☐ I am interested in formed displays. ☐ I am interested in forming machinery.

NAME _____

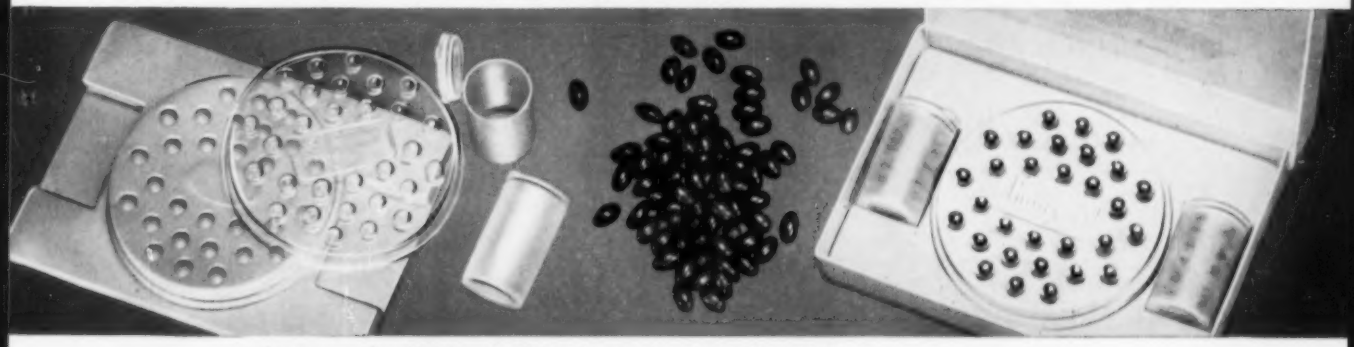
TITLE _____

COMPANY NAME _____

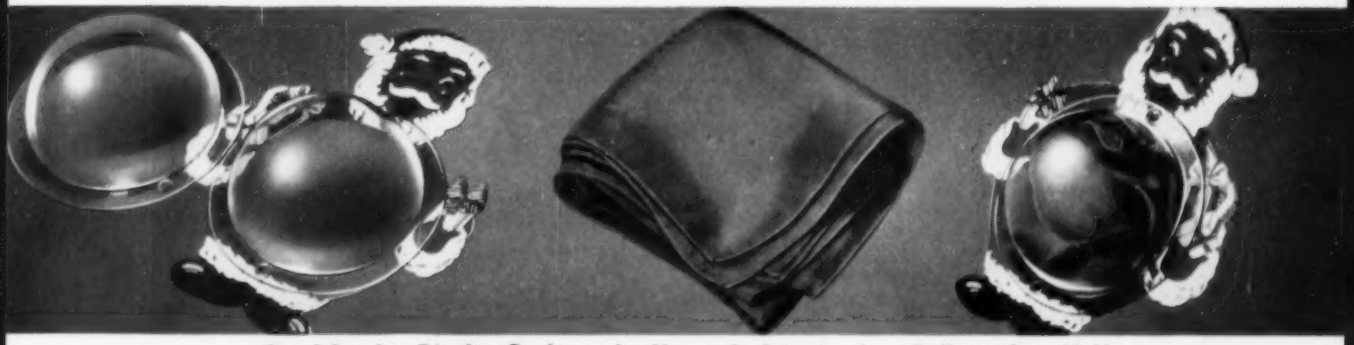
ADDRESS _____



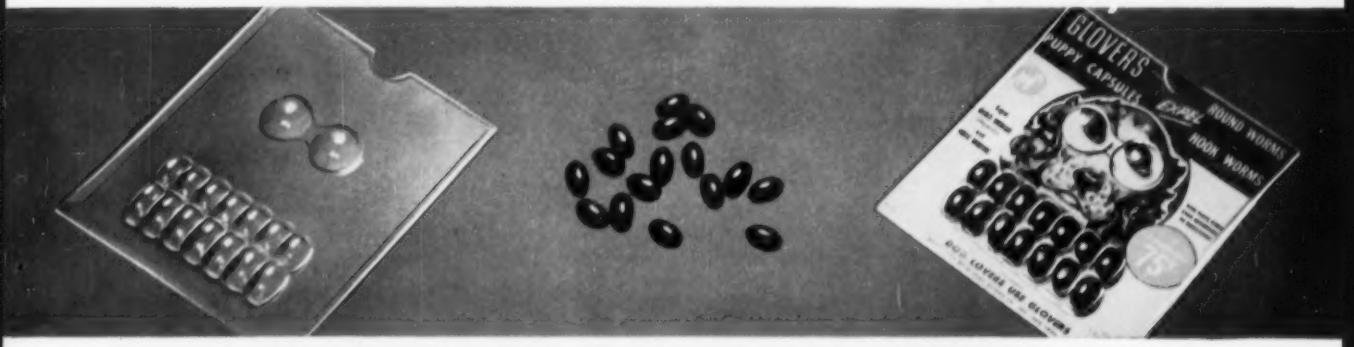
Imperial Pocket Knife, by Utility Printing Co., New York 10, N. Y.



Buticaps, by Mechanical Products, Los Angeles, Calif.

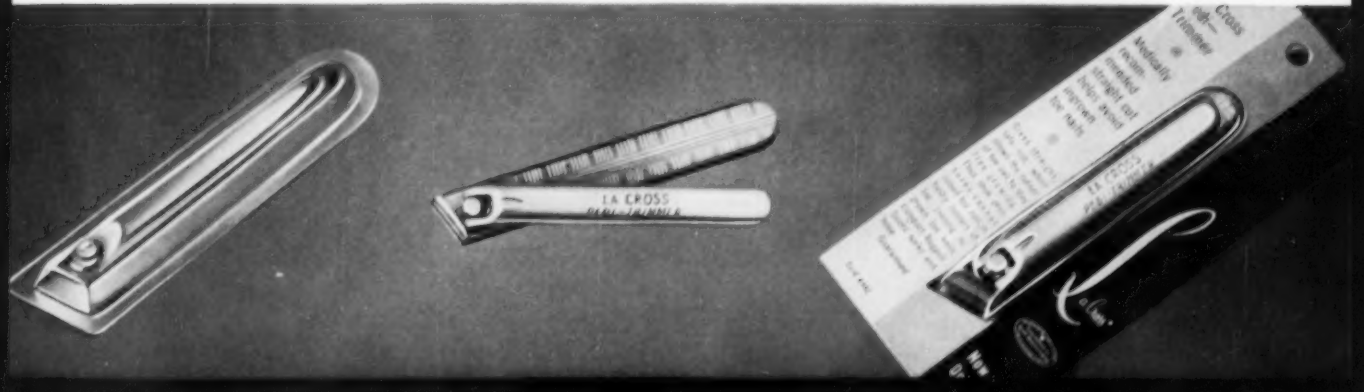


Carol Stanley Display Package, by Henry A. Schmitz, Inc., Ballston Spa, N. Y.



Glover's Puppy Capsules, by the Valley-National Corp., Milldale, Conn.

LaCross Pedi Trimmer, by Plastic Artisans, White Plains, N. Y.



To help you find that ***just-right*** *plant site . . .*

Every day we chart the business activity of 2319 communities

in Michigan, Indiana, Ohio, Kentucky, West Virginia, Virginia, Tennessee

THE RESULT . . . a perpetual inventory of plant-site information about a 45,000-square-mile territory where a large number of chemical plants provide a bountiful supply of raw material for plastics manufacture. This data is unequalled in up-to-the-minute accuracy and completeness.

For nearly fifty years, the American Gas and Electric System has served practically every home and business in this growing seven-great-state area that now includes 2319 towns.

Our men are in these communities every day, every week of the year—a network of on-the-job personnel carefully reporting changes of economic and social import.

Whether your need is dispersion, decentralization or expansion, the American Gas and Electric Company can help simplify your plant-site selection problem. As it has for hundreds of other manufacturers, both large and small, it can bring pertinent information right to your desk ready for measurement by your own yardstick.

You will find that this service will save many hours of valuable executive time in investigation and analysis. There is no charge. All we have to sell is power from capacity sufficient to meet the needs of any industry.

AMERICAN GAS AND ELECTRIC COMPANY
30 CHURCH ST., NEW YORK 8, N. Y.

OPERATING AFFILIATES:
APPALACHIAN ELECTRIC POWER COMPANY
INDIANA & MICHIGAN ELECTRIC COMPANY
KENTUCKY POWER COMPANY
KINGSPORT UTILITIES, INC.
OHIO POWER COMPANY
WHEELING ELECTRIC COMPANY

To get a more detailed description of the many industry advantages in the American Gas and Electric service area, write for the brochure "A 7-State-Plant-Site Trip—in 5 minutes."

You'll learn about water, transportation, labor, taxes, raw materials, education, community character and atmosphere and many other data necessary for pleasant, profitable plant operation. Address your inquiry in confidence to Mr. Lee Davis, Manager Area Development, 30 Church Street, New York 8, New York.

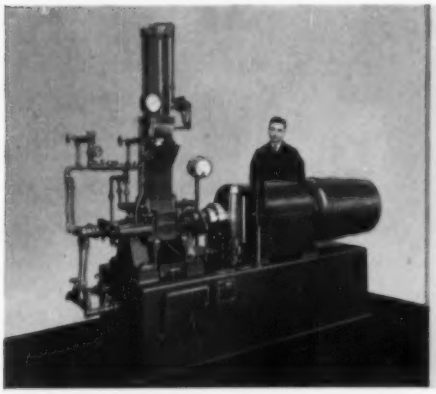
F-B LABORATORY EQUIPMENT

PERMITS WIDE SCOPE OF EXPERIMENTAL WORK... ACCURATE EVALUATION

6″ x 13″ TWO ROLL LABORATORY MILL

Four drive arrangements give wide choice of roll speeds and friction ratios: 1. Single AC motor to give constant roll speeds and 1.4:1 friction. 2. Single AC motor driving rolls through vari-speed sheaves to give variable roll speed and 1.4:1 friction ratio. 3. Two AC motors with vari-speed drives for friction ratios from even speed up to 2.1:1. 4. Two DC motors with variable voltage control for ratios from even speed up to 10:1 friction.

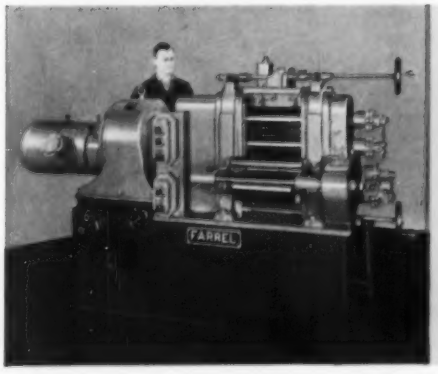
Standard mills have rolls bored for temperature control, self-contained automatic cascade lubrication for operation up to 350°F, swinging scraper and tilting guides. Optional features include chrome-plated rolls, extra hand scraper, air-operated scraper, ratchet roll adjustment, and batch-off roll.



SIZE B BANBURY MIXER

When this laboratory Banbury is equipped with a four-speed motor, as shown in the photograph, the effects of various speeds on different stocks can be readily determined. It has a capacity of 4 pounds of 1.50 specific gravity stock and will produce mixes comparable with those obtained in production size machines. Hence it is easy and economical to translate work done in the size B to a production Banbury, going, for example, from a 4-pound batch in the size B to a 450-pound batch in the size 11, or even a 1,000-pound batch in the size 27.

Entire unit is mounted on a high base of welded steel construction for convenient working height.



6″ x 13″ FOUR-ROLL CALENDER

This four-roll inverted L-type calender is designed to operate with roll temperatures up to 350°F. A 7½ HP, DC, adjustable-speed motor provides a wide range of roll speeds.

Adjustment of the top and bottom stack rolls is by hand-wheels. The side-roll adjusting screws are hand-operated by wrench. Adjustable guides are provided for the top and side roll pair.

All motors and controls, including the safety throwout, are explosion-proof. Brackets are mounted on the delivery side of calender frames to support a cooling drum, idler roll and windup.

Send for further information about this versatile laboratory equipment.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Pittsburgh, Chicago, Fayetteville (N.C.), Los Angeles, Houston

Farrel-Birmingham®

FB-1041

DOW ANNOUNCES *a new* POLYETHYLENE

Optimum uniformity of material and granulation provides uniform low-cost molding operations

Uniformity—it's the key to good molding—but until today you've had to pay a premium price for specially processed polyethylene for optimum uniformity.

Now, with Dow's new polyethylene, you get optimum uniformity at *no extra cost.*

- *Uniformity of material* . . . Dow's process gives uniform molecular weight distribution and uniform physical properties.

- *Uniform granulation* . . . gives you optimum combination of uniform low bulk factor and uniform free flow and constant feed.

designed to give you premium uniformity without premium cost

Add these together and you have uniform operating conditions that cut your molding costs. Now you can have this profitable combination . . . premium uniformity of material that makes low-cost uniformity of operation . . . in Dow Polyethylene without paying extra price.

You have another big plus in dealing with Dow for your polyethylene requirements. You will find the finest *customer service* in the industry ready, willing and able to devote its expert skills to helping you. If you are currently using . . . or considering . . . polyethylene for film, wire and cable coverings, bottles and closures, housewares and toys or pipe, call your nearest Dow office. We will be glad to have a representative call on you with complete details of *new* Dow Polyethylene. THE DOW CHEMICAL COMPANY, Plastics Sales, Midland, Michigan.

you can depend on DOW PLASTICS

DOW

big profits
on small jobs
with the

MINI-JECTOR

TRADE MARK

the proven, low-cost, economical plastic injection molding machine

Here are the small thermoplastic injection molding machines that do a small job in a big way! Economical to operate and low in cost, these ¾ ounce plastic injection molding machines are turning out thousands of small plastic items every day for hundreds of satisfied users. Molds any thermoplastic . . . including Nylon. The Mini-Jectors are the most versatile machines in their class. Simple and compact in design, Mini-Jectors operate easily and efficiently and owners everywhere find they pay for themselves many times over.

MODEL 60, ¾ oz. injection capacity per shot. Mold size 6"x5"x5⅛". 5.5 lbs. per hour plasticizing capacity. Molds 6 sq. in. of area. 4 lbs. capacity of material hopper. Hydraulic system for injection. Features semi-automatic knockout arrangement for fast operation and quick mold change.

MODEL 40, Bench model, ¾ oz. cap., complete with standard equipment, hand knockout, only $350. MODEL 41, Floor model, complete with standard equipment; foot die knockout.

MODEL 50, Similar to Model 40, except it is provided with hydraulic system for injection instead of manual operation. ¾ oz. capacity, features simplified knockout arrangement.

MANUFACTURERS . . . The many applications of the Mini-Jector make it a popular choice of manufacturers, large or small, for developing experimental parts, field testing and pilot models. It has also served as an introduction for many manufacturers to plastic injection molding.

CUSTOM MOLDERS . . . Custom molders with large capacity molding machines find the Mini-Jector invaluable in making fast and economical running tests on new materials and in the preparation of sample parts, die try-outs, or small commercial runs.

SCHOOLS, COLLEGES, UNIVERSITIES . . . Mini-Jectors have found wide use in educational institutions of all levels in teaching the behavior and characteristics of a wide variety of thermoplastics.

EVERY DAY THOUSANDS OF ITEMS ARE BEING PRODUCED PROFITABLY ON THE MINI-JECTOR.

WRITE TODAY for free literature that will tell you how you can use the Mini-Jector to solve your injection molding problems.

NEWBURY INDUSTRIES

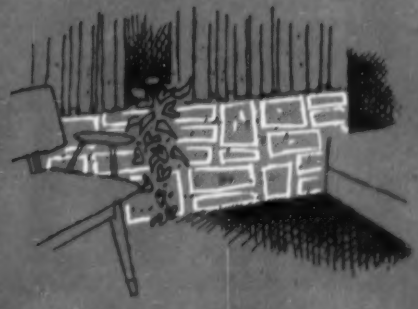
2020 Munn Road, Newbury, Ohio

Specializing in the Production and Development of Plastic Injection Molding Machines of One Ounce or less Capacity.

it's so natural... **NIXON RIGID VINYL teamed with Decro-Wall***

The newest innovation in textured wall coverings are vacuum formed of Nixon rigid vinyl sheets . . . to create beautifully realistic brick and stone patterns . . . at very low cost.

Nixon rigid vinyl was used because of its reputedly excellent dimensional stability. When vacuum formed or deep drawn, it will faithfully reproduce every contour and bend . . . sharply bring out every feature of design.



For the do-it-yourself market, sturdy, resilient Decro-Wall* comes in 2-by-4 ft. lightweight sheets, which can be easily applied to all surfaces . . . wiped clean with a damp cloth . . . and are available in a variety of patterns and colors.

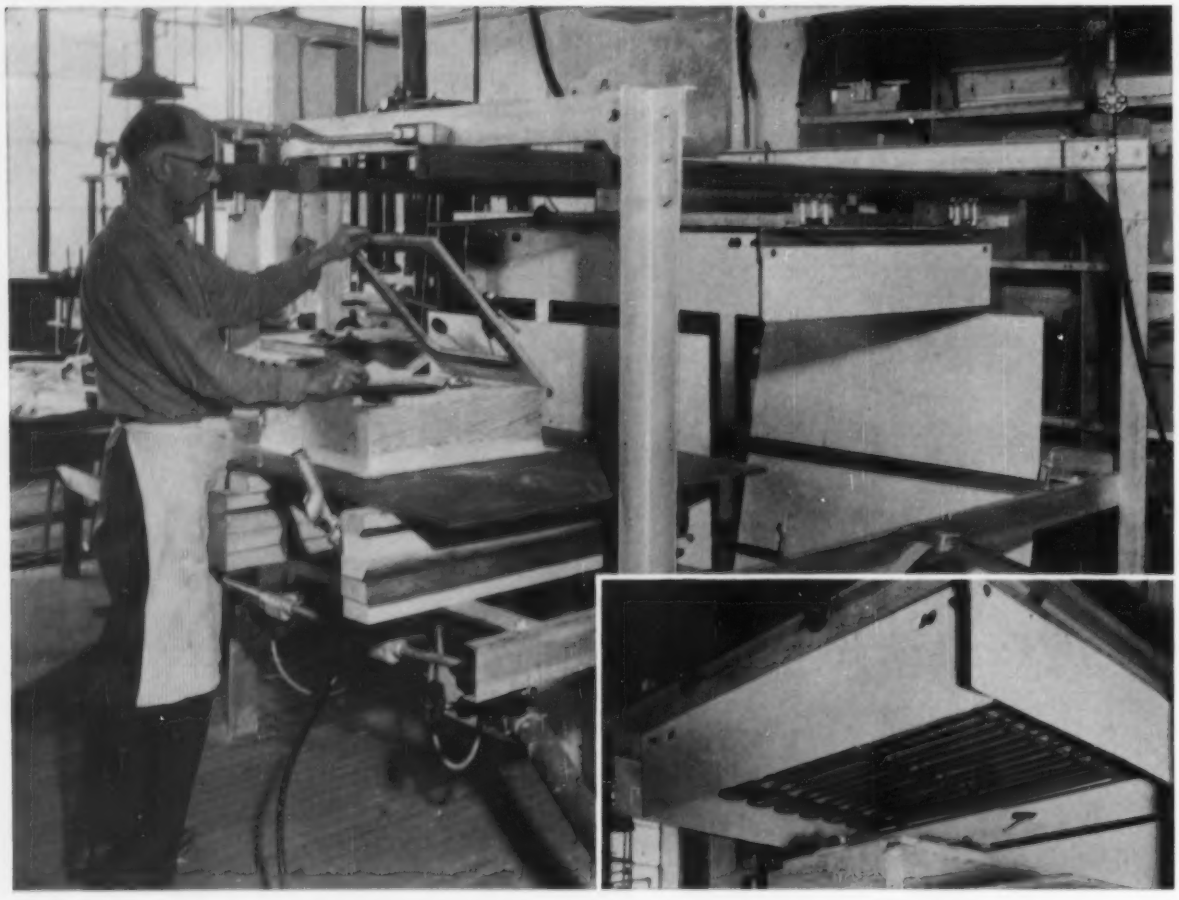
*Decro-Wall (Pat. Pend.) coverings are a product of National Vacuum Molding Corporation, Yonkers, N. Y.

NIXON supplies a complete line of FORMABLE SHEETS.

For further information, write or phone NIXON NITRATION WORKS

Nixon PLASTICS

founded 1898, Nixon, N. J. • Phone: New Brunswick, Charter 9-1121; Metuchen, Liberty 9-0200; New York Extension WOrth 4-5290 • Chicago, Ill. BRANCH OFFICE, 510 North Dearborn St. Phone: Michigan 2-2363 • St. Louis, Mo., C. B. JUDD, 3687 Market St. Phone: Lucas 8082 • Leominster, Mass., A. F. PERRY CO., Box 214. Phone: Leominster 7-2120 • Canadian Distributor: Crystal Glass & Plastics Ltd., 130 Queens Quay E., Toronto.



electric far-infrared uniformly pre-heats plastic sheets for vacuum forming . . . at low cost

To heat various types and thicknesses of plastic sheets to required temperatures for vacuum forming presented a problem to Clinwell Plastics, Inc., Buffalo, N.Y. The operation demanded precise control of both heating time and temperature on a production basis.

Two Chromalox electric far-infrared radiant panels proved the economical and efficient solution. Mounted so that distance from heater to work is readily adjustable, these panels direct a blanket of far-infrared heat onto the work. Long, far-infrared wavelength is absorbed rapidly by transparent plastic sheets. Heating time varies from ten seconds to one minute, depending upon type of material, thickness of sheet, and depth of draw.

Results are a quickly installed, low cost setup for vacuum forming. Short heat up time of equipment. Extremely short operating time cycles. Consistently good products with low rejection rate.

This problem-solution-result approach has enabled us to help many manufacturers produce better, faster, at lower cost.

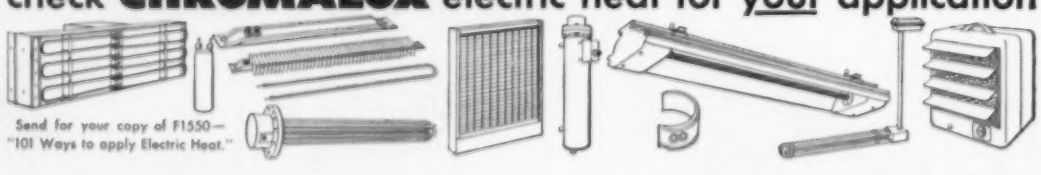
Always available to you are our research, engineering, design and modern manufacturing facilities. The world's largest factory stock of industrial electric heaters plus local stocks at strategic points. And a 33-city nationwide sales-engineering service.

Let us know your problem for controlled heat and we'll help you find the right answer—electrically.

A 4480

EDWIN L. WIEGAND COMPANY
7503 Thomas Boulevard, Pittsburgh 8, Pa.

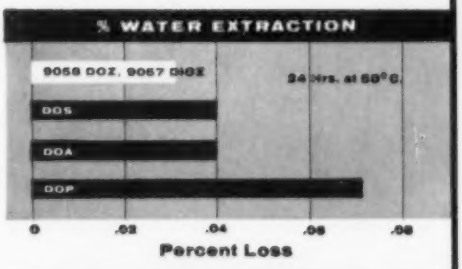
check CHROMALOX electric heat for your application

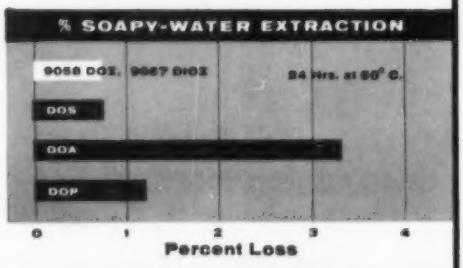


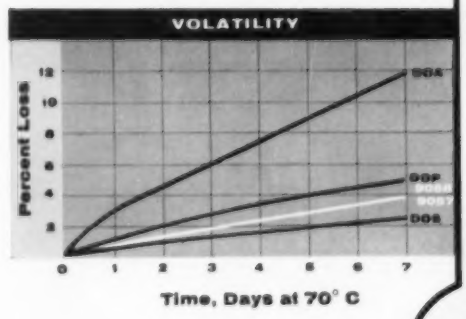
Send for your copy of F1550—"101 Ways to apply Electric Heat."

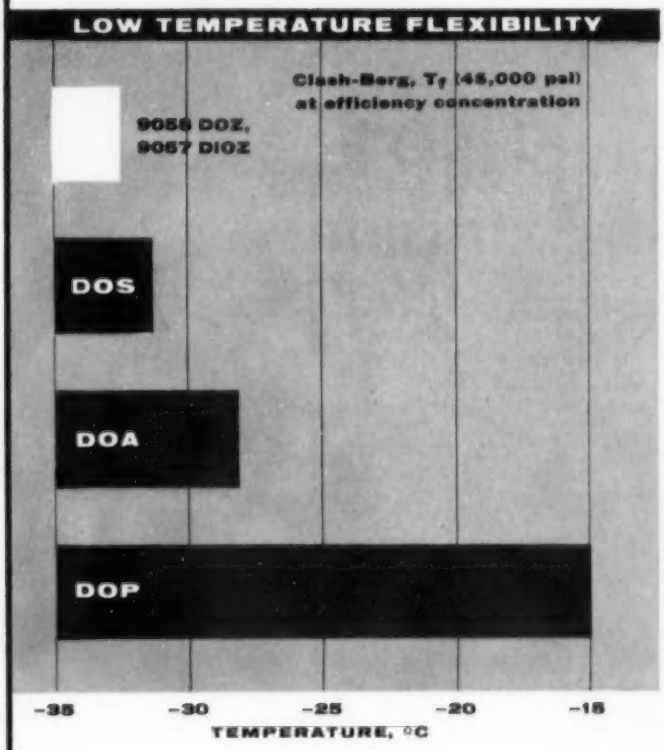
DOZ gives you low-temperature flex—PLUS!

Here's proof that Plastolein® 9058 DOZ is the best all-around low-temperature plasticizer available!









When a plasticizer does *many* things well, it is reasonable to expect product improvement, lower costs and increased profits. That's exactly what happens when you use Plastolein 9058 DOZ or its companion product, Plastolein 9057 DIOZ. As the charts illustrate, both impart unexcelled low-temperature flexibility, *and at the same time* provide low volatility, low water extraction, and low soapy-water extraction. In addition, they possess excellent resistance to heat and light, provide low-viscosity dispersions, and impart excellent drape to film and sheeting.

When you put all of these features into your calendered and cast films, calendered sheeting, calendered and dispersion coated fabrics, fabricators of finished goods will be more receptive to your products, will reorder time after time. That's why you should use Plastoleins 9058 DOZ or 9057 DIOZ. Write Dept. F-11 for descriptive literature or evaluation samples, today.

Emery

Fatty Acids & Derivatives
Plastolein Plasticizers
Twitchell Oils, Emulsifiers

New York • Philadelphia • Lowell, Mass. • Chicago • San Francisco • Cleveland

Warehouse stocks also in St. Louis, Buffalo, Baltimore and Los Angeles

Export: 2205 Carew Tower, Cincinnati 2, Ohio

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

Complete Plants for Extrusion

tubes, sheets and films

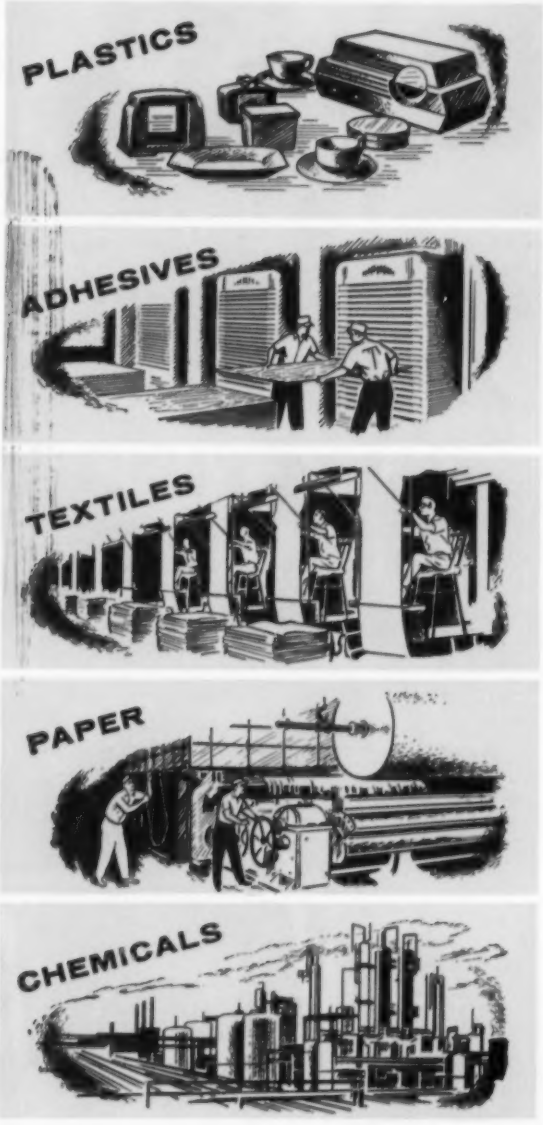
Extruder S 90 RGV
90 mm screw - diameter = 3.54 "

ROPP

A·Reifenhäuser
MASCHINENFABRIK
TROISDORF • WEST GERMANY

U.S. Representative for sales and service:
H. H. HEINRICH CO.
111 - 8th Ave. NEW YORK 11, N.Y.

Heyden FORMALDEHYDE helps in Industry's BIG JOBS...



It is interesting to note that further growth is predicted for the major products made from Formaldehyde. This applies, for instance, to phenolic molding and laminating resins—urea and melamine resins for textiles, paper and plywood—and various organic chemicals.

Heyden Formaldehyde is helping in this growth, as it has right from the original development of these products. Experience, gained through this long association with customer problems, has enabled Heyden to meet the most exacting needs of each use. As new applications arise, Formaldehyde with the proper specifications will be available from Heyden.

Both methanol-inhibited (N.F.) and methanol-free forms of Formaldehyde are supplied by Heyden. If this chemical is one of your raw materials, why not discuss your requirements with the Heyden sales office nearest you.

●

HEXAMETHYLENETETRAMINE

PARAFORMALDEHYDE

HEYDEN
CHEMICAL CORPORATION

342 Madison Avenue, New York 17, N. Y.

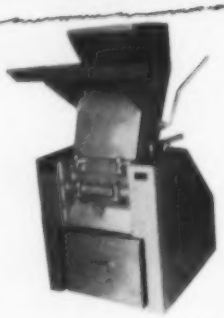
Chicago • Cincinnati • Detroit • Philadelphia • Providence • San Francisco

FINE HEYDEN CHEMICALS

Benzaldehyde • Benzoic Acids • Benzyl Chloride • Beta-Oxynaphthoic Acid • Chlorotoluenes • Creosotes • Formaldehyde • Formic Acid • Guaiacols Parahydroxybenzoates • Pentaerythritols • Propyl Gallate • Resorcinol • Salicylates • Salicylic Acid • Sodium Benzoate • Sodium Formate

IMS STOCK EQUIPMENT

M-400 Two-Stage Big Part Grinder. Fastest Granulator Ever Made.
Complete ... $2975.00



M-40 11" x 17" Throat Heavy Duty, Single Stage Scrap Part Grinder.
Complete $1795.00

M-4 5⅛" x 8½" Throat All-Purpose Grinder
Complete . . $768.50

M-3 6-1/2" x 7" Throat Lowest Cost Sprue and Parts Grinder
Complete, only ... $548.50

Low Cost Injection Mold Circulator.
Complete $369.50

6" Gate Cutters
Each $3.65

for the Modern INJECTION MOLDER

Mold Clamp Sets
Per Set of 8 ... $55.15

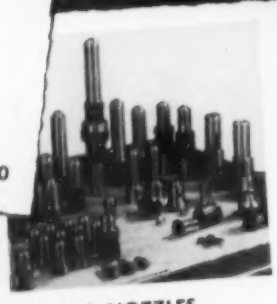
Silicone Spray Mold Release
Per Doz. (Postpaid)
..... $18.00

IMS DRUM TUMBLERS

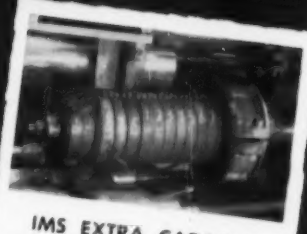
150 lb.	3/4 HP Model T-2	$498.50
300 lb.	2 HP Model T-2B	785.00
400 lb.	3 HP Model T-2C	1185.00

Remember

Injection Molders Supply Co. specializes on replacement nozzles and heating cylinders for all types of injection machines.



IMS NOZZLES
For All Injection Machines

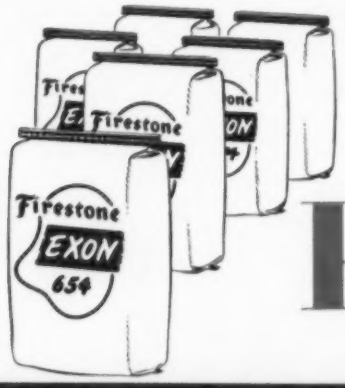


IMS EXTRA CAPACITY HEATING CYLINDERS
Stock Models for Reed-Prentice Machines
Others to Order.
Prompt Delivery

INJECTION MOLDERS SUPPLY CO.

3514 LEE ROAD • WYoming 1-1424 • CLEVELAND 20, OHIO

EXON: each resin engineered for a specific problem



EXON 654

specifically for

Plastisols

Waste no more time on grinding — EXON 654 never needs it! Even when simple stirring equipment is used, Firestone's plastisol resin readily disperses in plasticizer.

It's an extremely fine powder with high molecular weight, created to impart excellent heat and light stability, physical toughness and chemical stability to your products.

Slush molders particularly will appreciate the exceptional viscosity, stability and flow properties of pastes formulated from EXON 654. These pastes are unsurpassed for processing ease. They gell quickly. And they always coat the mold smoothly and evenly.

Whatever your particular problem, you're likely to find the specific remedy among Firestone's many Exon resins.

Firestone

EXON®

For complete information or technical service on the entire line of EXON resins, call or write today.

CHEMICAL SALES DIVISION

FIRESTONE PLASTICS COMPANY, POTTSTOWN, PA., DEPT. 2W

DIVISION OF FIRESTONE TIRE & RUBBER CO.

Puts your business on a cash basis

If you are a plastics manufacturer or a wholesaler with annual or potential sales of $1,000,000 or more you can profitably use our kind of banking service to provide increased working capital without increased indebtedness or dilution of profits.

Why not investigate this modern approach to your money problems and learn how you can put your business on an all-cash basis, with wider opportunities for sales and profits.

More than four hundred companies in various industries are now profitably using our banking services.

Textile Banking Co., Inc.

Providing operational financing for manufacturers and distributors of furniture, apparel, electronics, plastics and textiles.

55 Madison Avenue, New York 10, N. Y.

15 FT. One-piece Plastic Boat Hulls made possible . . . by KELLERING

The PRATT & WHITNEY BG-22 KELLER

AUTOMATIC TRACER-CONTROLLED MILLING MACHINE . . . cuts another BIG job down to size. The R. H. Freitag Mfg. Co. of Akron, Ohio provided the Molded Fiber Glass Body Co., Ashtabula, Ohio with molds to be used in producing about 300 fifteen-foot fiberglass motorboat hulls a month. The male mold was duplicated from a wood model and the female from a fiberglass model, on Freitag's 16' x 7' Keller BG-22 Machine.

Standard-size Type BG-22 Keller Machines have work size capacities of 10' x 5', 12' x 6' and 14' x 7'. Machines with special combinations of travels required to do specific jobs can be built on order.

Whatever the size — big or small — or shape — simple or complex — of the plastic parts you want, a Keller Machine can provide the capacity and ability to produce accurately, quickly, economically the dies and molds you need.

P & W Keller Machines are designed and built specifically for tracer-controlled milling and can handle a wide variety of jobs without major adaptation by expensive attachments.

MODERNIZE with PRATT & WHITNEY REPLACE FOR PROFIT

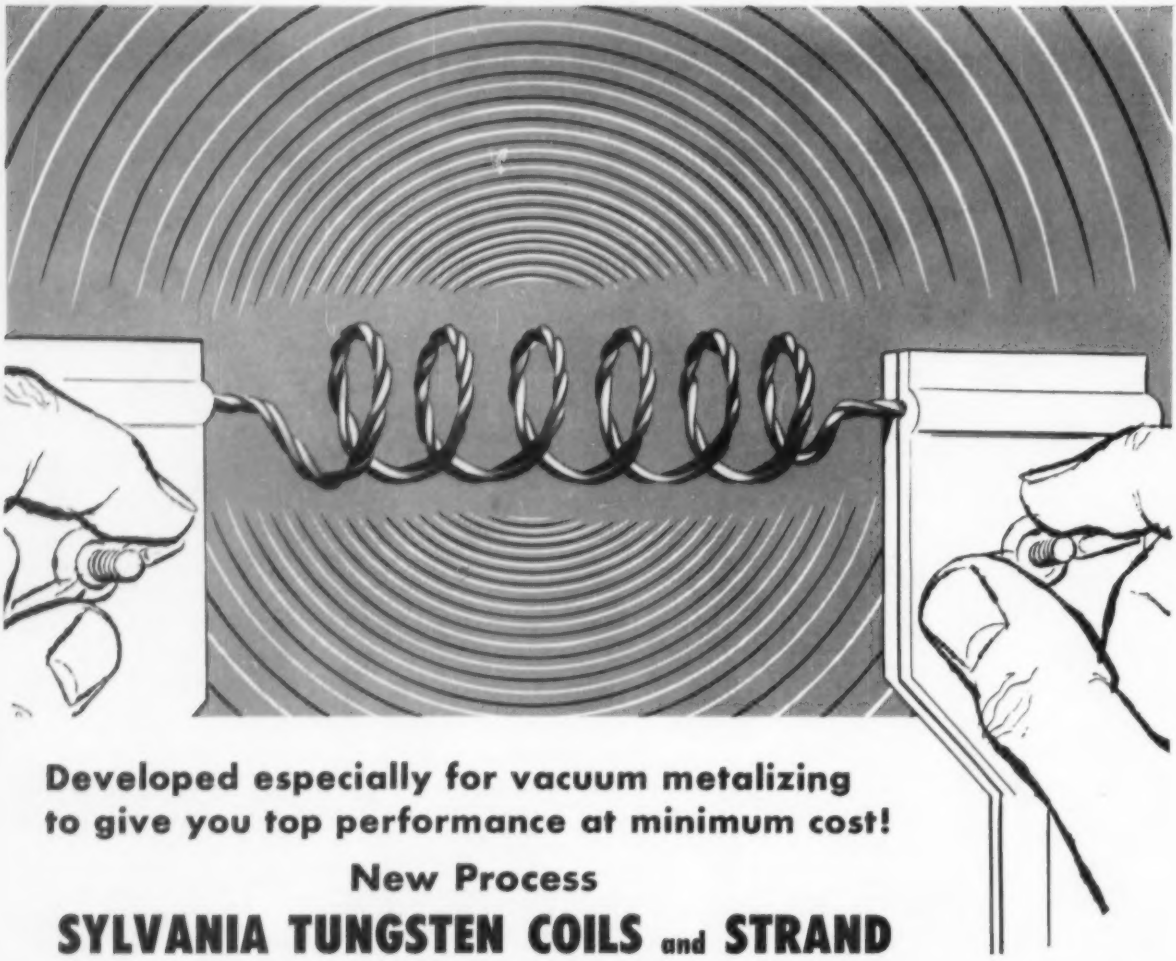
Write now on your Company letterhead for more detailed information. Request your free copy of —
Circular No. 537 on Type BG-22 (for large molds)
Circular No. 565 on Type BG-21 (for medium size molds)
Circular No. 490-3 on Type BL (for small molds)

PRATT & WHITNEY
WEST HARTFORD 1, CONNECTICUT, U.S.A.

BRANCH OFFICES . . . BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI
CLEVELAND • DETROIT • LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH
ROCHESTER • SAN FRANCISCO • ST. LOUIS • EXPORT DEPT., WEST HARTFORD

FIRST CHOICE FOR ACCURACY SINCE 1860

MACHINE TOOLS • CUTTING TOOLS • GAGES



Developed especially for vacuum metalizing to give you top performance at minimum cost!

New Process
SYLVANIA TUNGSTEN COILS and STRAND

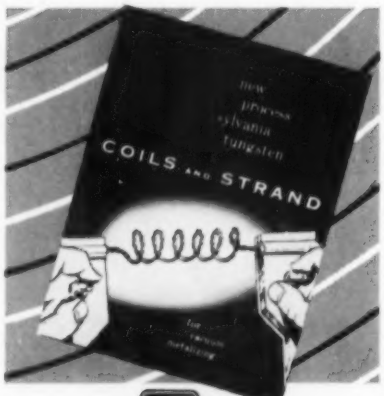
To help you get more shots per dollar in vacuum metalizing, New Process Sylvania source heater materials are produced under exacting standards of uniformity throughout every step of manufacture. From tungsten ore to finished coils and strand, every production operation is done in Sylvania's own plants.

Special tungsten wire is coiled specifically for vacuum metalizing to assure both maximum evaporating capacity and long service life. Sylvania offers you a wide selection of ready-made tungsten coils, in single or multiple strand, each designed for a specific metalizing application.

If you prefer to form your own source heater coils, there are a full range of wire diameters and types to choose from. Whenever you encounter special application problems, our engineers will gladly help you work them out. Write for your copy of the newly published *"New Process Sylvania Tungsten Coils and Strand,"* presenting latest application and performance data.

SYLVANIA ELECTRIC PRODUCTS INC.
1740 Broadway, New York 19, N. Y.
In Canada:
Sylvania Electric (Canada) Ltd.,
University Tower Bldg.,
St. Catherine St., Montreal, P. Q.

WRITE FOR NEW BOOKLET TODAY



SYLVANIA®

Lighting • Radio • Electronics • Television • Atomic Energy

"Dutch Boy" Plasticizers

	"Dutch Boy" Plasticizer	Low temp flex* Clash/Berg Deg Cent	% Volatility* 16 hrs., 195° F A/C-12 ml film	Vol Resistivity* at 25° C x 10^{12} ohms/cm	Ref Index 25° C	Spec Gravity 20/20° C	Cost per lb	Suggested Uses
	Double Duty Primary Type							
New	**NL F-22** (semi-polymeric)	— 16.5	5		1.480	0.977	.36	High quality extruded and calendered products
New	**NL F-32** (mixed adipate)	— 36	11		1.449	0.919	.425	For low temp. flexibility and good volatility
New	**NL F-33** (modified adipate)	— 38	19		1.447	0.920	.415	For excellent low temp. flexibility
	NL F-41 (modified adipate ester)	— 36	13		1.446	0.920	.48	High quality sheeting
	General Purpose Economy Type							
	NL A-54 (mixed alkyl phthalate)	— 3	15	80	1.482	0.976	.285	Wire insulation stocks
	High Purity Standard Type							
	NL A-10 (DBP)				1.490	1.046	.30	Lacquers
	NL A-20 (DOP)	— 10	14	30	1.484	0.985	.305	General purpose
	NL A-30 (DIOP)	— 9	11	30	1.484	0.984	.305	General purpose
New	**NL A-40 (DDP)**	— 6	3	50	1.482	0.965	.305	Plastisols and wire insulations
New	**NL A-50 (ODP)**	— 7	7	35	1.484	0.975	.305	General purpose
	NL C-20 (DOS)	— 36	7		1.450	0.915	.61	General purpose with extremely high quality

*Typical plastic mix. Details on request.

Take a *New* look

at the latest developments in "Dutch Boy" Plasticizers

See for yourself *their outstanding competitive advantages*

Look first at NL F-22, 32 and 33

New. Unique. NL F-22, 32 and 33 are "Dutch Boy" Double-Duty Plasticizers . . . a new type that gives you factory prebalanced low temperature flexibility and low volatility plus good stability and purity. See columns two and three, noting the high values of *both* properties. Note, too, that NL F-22 has outstanding low volatility.

A fourth "Dutch Boy" Double-Duty Plasticizer, NL F-41, is equally outstanding for low temperature flexibility.

Together, these four "F" Plasticizers make a valuable contribution to the materials available for producing vinyl film, sheeting and flooring compounds.

Now look at NL A-40 and 50

These two new "Dutch Boy" standard Plasticizers reach a new high in commercial purity.

This new high in purity makes "Dutch Boy" NL A-40 particularly interesting to the insulated wire industry . . . makes "Dutch Boy" NL A-50 the logical ODP to replace DOP.

Exceptional purity also characterizes the other "Dutch Boy" standard Plasticizers . . . NL A-10, 20 and 30 and NL C-20.

When it comes to formulating economical electrical insulations, Dutch Boy NL A-54 is in a class by itself . . . a low cost material with high electrical properties. See columns 4 and 7 especially.

If you would like full technical information on any of these plasticizers . . . or samples . . . write:

Dutch Boy® CHEMICALS

NATIONAL LEAD COMPANY

111 Broadway, New York 6, N. Y.

In Canada: CANADIAN TITANIUM PIGMENTS LIMITED
630 Dorchester Street, West · Montreal

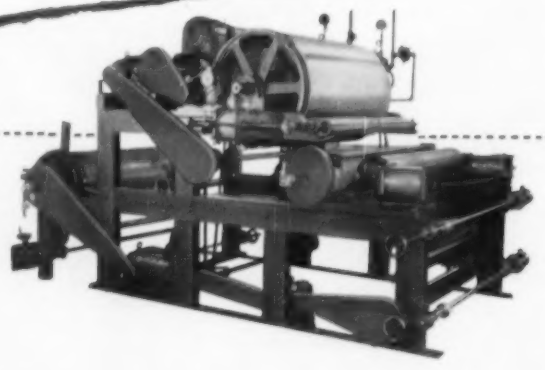
Off the Press!

LAMINATES, EMBOSSES, PRINTS in one operation!

The amazing new Laminator-Embosser that laminates **without adhesives** . . . embosses and prints in the same operation.

Completely flexible, the machine performs all three functions on all plastic films. It laminates stretch back or drills and valley prints to closest tolerances. Compact, costing a fraction of the price of mammoth equipment usually performing these jobs, it is especially practical on short runs.

If your operation can benefit by fast, flexible equipment at considerably lower outlay and upkeep, you're invited to see the new Lembo Laminator-Embosser in action. We will be happy to make experimental runs for you. Just write or 'phone LAmbert-5-5555.

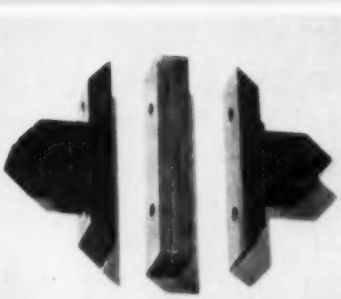


ROTOGRAVURE
LEMBO PRESS
FLEXOGRAPHIC

LEMBO MACHINE WORKS, INC., 248 EAST 17th ST., PATERSON 4, N. J. • Mfrs. PRESSES · EMBOSSERS · LAMINATORS · ROLLERS

UNIFORMITY

Makes The Big Difference In LAMINATION FABRICS



MT. VERNON EXTRA

Gives You Greater Fabric Uniformity

FABRICS ENGINEERED TO FIT YOUR NEEDS – Need adaptation of an existing fabric to your special purposes? Or creation of an entirely NEW fabric – cotton, synthetic or blend – to meet your specifications? Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

Mt. Vernon-Woodberry Mills

TURNER HALSEY COMPANY
Selling Agents

Main Office: 40 Worth St. • New York

Branch Offices: Chicago • Atlanta • Baltimore • Boston • Los Angeles

One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. Here fabric thickness after weaving is being gauged.

Fred Sutro
Kansas City

Bill Schopflin
Kansas City

Howard Millington
Kansas City

Dean Boldt
Kansas City

George Olson
New York

Tom Murphy
New York

Warren Peterson
New York

Bob Osborne
Boston

Poly-Eth News from the Southeast

Sam Silberkraus
Los Angeles

Dick Bishop
Chicago

Pete Dornik
Chicago

Vic Denslow
Chicago

Carl Virgin
Ohio

Reported by
RAY BAILEY
Spencer Poly-Eth
Sales Representative

Plastic molding and extrusion firms are growing rapidly in the expanding industrial economy of the Southeast... Spencer's excellent delivery service makes for impressive savings to users of Poly-Eth Polyethylene by eliminating the necessity of large inventories...And Poly-Eth is helping cut production costs, too.

A leading toy manufacturer has found that Poly-Eth resins can be molded at lower temperatures...He reports that since warpage is no longer a problem, his production capacity has increased...Many molders have reduced raw material costs 20% or more by switching from precolored material to Poly-Eth and dry colors.

A polyethylene pipe manufacturer reports that he has an order for 4,000 feet of 4" Poly-Eth pipe — in one continuous length!.. The problem: how to make the 30-mile delivery from production plant to customer? Our Tech Service team is wrestling with this one.

We'd be mighty pleased to help you with any problem you may have, too...Just contact your nearest Spencer Poly-Eth Sales Office.

SPENCER CHEMICAL COMPANY

GENERAL OFFICES: Dwight Building, Kansas City 5, Missouri

DISTRICT OFFICES: Dwight Building, Kansas City, Missouri, BAltimore 6600; 500 Fifth Avenue, New York, New York, LAckawana 4-7762; First National Bank Building, Chicago, Illinois, ANdover 3-2656

WEST COAST SALES AGENT: Riverdale Plastics and Chemical Company, 8510 Warner Drive, Culver City, California, TExas 0-1000

WAREHOUSES: New York City; Chicago; Los Angeles; Orange, Texas

Poly-Eth *by* **SPENCER**

Look for our new series of national ads promoting polyethylene uses.

SPENCER®

DESIGNS AND BUILDS

BAKER AUTOMATICS

FOR YEARS AHEAD PERFORMANCE

a battery of 100 ton Automatics going to an industry leader

Discussed in the Plastic trade for years and now a reality

100 TON AUTOMATICS

DESIGNED AND BUILT BY
THE MANUFACTURERS OF MACHINE TOOLS
SINCE 1875

BAKER BROTHERS, INC.

1010 POST STREET
TOLEDO 10, OHIO

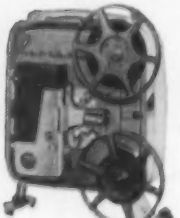
With the biggest expansion program in its history already in progress, automation minded men of the plastics industry are specifying Baker Automatics . . . because the Baker is geared today to tomorrow's production challenge. Baker Automatics perform every known function in automatic molding in any relationship, and all adjustable as to time and length of function. Get ahead of competition . . . look into the numerous advantages of Baker 15–25–50–75–100 and 150 Ton Automatics. Do this, and you'll buy Baker.

UNIVERSAL LOADING BOARDS—COMBS
POWDER FEEDERS—ROPE CUTTER FEEDERS
INVESTIGATE OUR LEASING ARRANGEMENTS

U. S. ROYALITE WINS ANOTHER CASE!

"Impact" couldn't crack it!

Exhibit "A"—The ROYALITE case of the new Revere "777" 8 mm. portable projector, is cleverly designed by Revere Engineers as an integral part of the machine. The removable cover contains a ribbed inner liner to which is riveted a reel support, cord retainer and lock. Revere, a user of Royalite cases since 1949, has pioneered in engineering its products for functional beauty.



TO WIN, time after time, in the trial of use and abuse, any "portable" must have an eye-appealing case that stands up under hard knocks. A case like that of the fine, precision-built "777" portable projector, *formed from* U. S. ROYALITE.

This tough, versatile fabricating material has the structural rigidity of plastic fortified with rubber for needed impact resistance.

Supplied as a thermoplastic sheet, it is easily formed to complicated shapes with sharp detail on low-cost tooling, and for limited runs or prototypes, dies can be quickly and inexpensively made of wood or resin as well as metal. Needed supports and dividers to receive accessory parts can be formed simultaneously with the case, saving assembly operations.

U. S. Royalite thermoplastic sheets can be obtained in attractive standard or special built-in colors with glossy-smooth or dull textures. Various degrees of rigidity are obtainable, as well as flame-resistant (self-extinguishing) material. Contact us at once to see how Royalite can be turned into cases or covers for *your product*... cases that combine beauty, utility, and economy as never before. United States Rubber Company, 2638 Pulaski Road, Chicago 39, Ill.

U.S. ROYALITE®
TOUGH, VERSATILE FABRICATING MATERIAL

US RUBBER United States Rubber

An important new source of

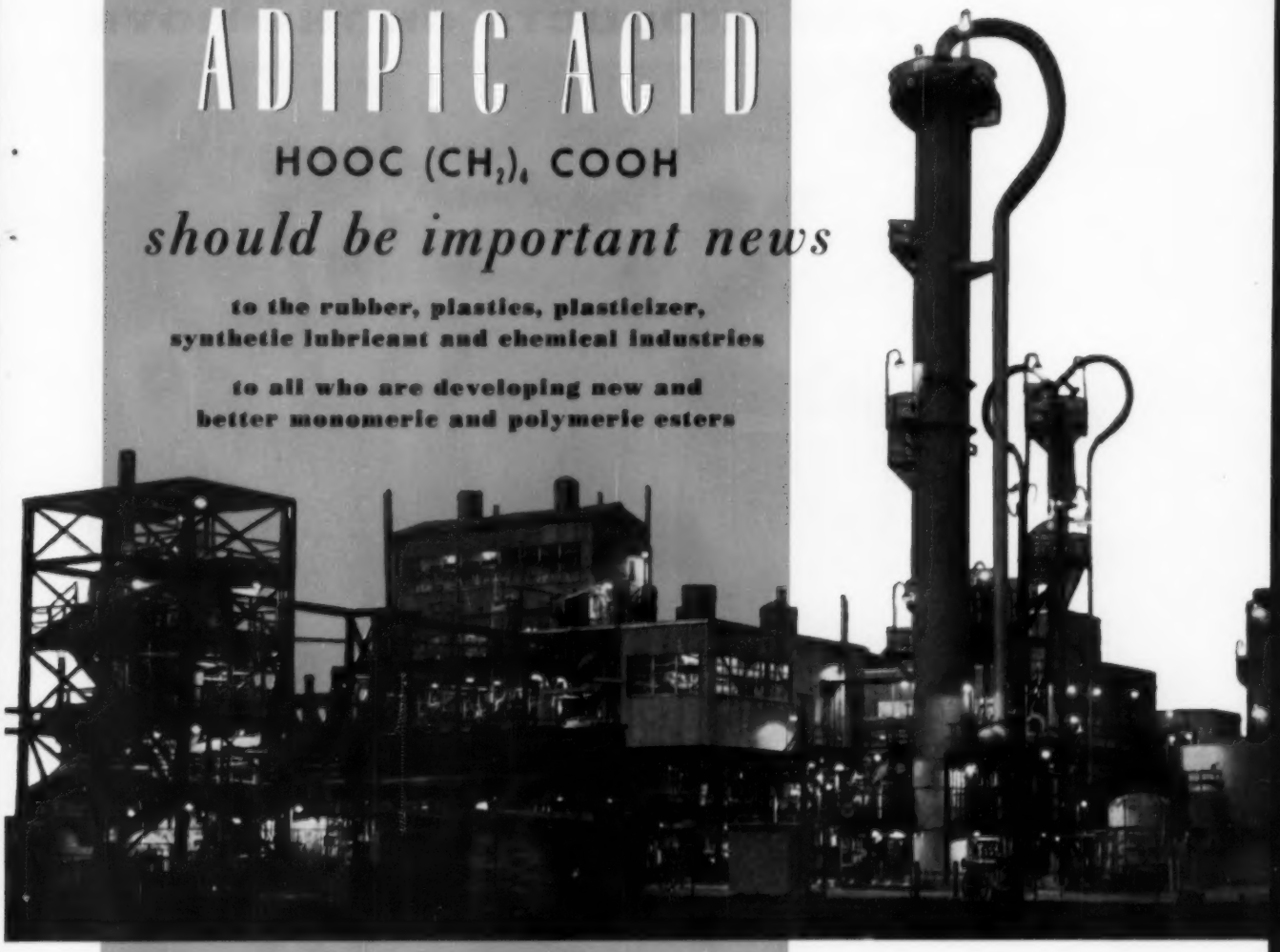
ADIPIC ACID

$HOOC(CH_2)_4COOH$

should be important news

to the rubber, plastics, plasticizer, synthetic lubricant and chemical industries

to all who are developing new and better monomeric and polymeric esters



National Aniline's new Adipic Acid plant at Hopewell, Virginia is important to America and to American industry. For its production of this versatile dicarboxylic acid will be both substantial and basic.

Through Allied Chemical resources, it is completely integrated right back to the most basic raw materials. Through Allied Chemical research, the manufacturing process is efficient, uniform, continuous. Through modern plant engineering and construction, its output will be competitive in every respect.

From present and potential users of ADIPIC ACID, we invite inquiries for samples, technical data and quotations on price and delivery.

SEND FOR TECHNICAL BULLETIN I-12

This comprehensive 8-page technical bulletin on National Adipic Acid gives physical and chemical properties; principal reactions on the carboxyl and alpha methylene groups; solubility curve, and suggested uses with copious literature references. Your copy will be sent without obligation on request.

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Allied Chemical

Boston Providence Philadelphia Chicago San Francisco Portland, Ore. Greensboro Charlotte Richmond Atlanta Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto

hercocel®

FOR PRODUCTS ON THE MOVE

EASY TO USE—All it takes to operate the new Dormeyer "Edge-Well" Sharpener is finger-tip pressure on the center bar. For added safety, sharpener stops rotating as soon as pressure is released.

MADE TO LAST—A product of the Dormeyer Corp., Kingsbury and Huron Sts., Chicago 10, Ill., the "Edge-Well" is guaranteed by the manufacturer for one year against defects in material or workmanship. Hercocel housing by Plastic Precision Parts Co., 2535 West Madison St., Chicago, Ill.

As good looking as it is functional, the new Dormeyer "Edge-Well" Knife and Scissor Sharpener is a valued addition to anyone's kitchen. One sharpening wheel quickly gives a perfect edge to knives of any size or type; the other wheel restores scissors to "like new" cutting condition.

Like so many products today, the "Edge-Well" is molded with Hercocel A—Hercules® cellulose acetate. Long-wearing and durable, Hercocel is the perfect plastic for products that must stand up under hard usage. And Hercocel lends itself to modern styling, provides a finish that means extra sales appeal. In design, production and sales, versatile Hercocel keeps products on the move.

Cellulose Products Department

HERCULES POWDER COMPANY

INCORPORATED

916 Market St., Wilmington 99, Del.

CP55-5

"What Lies Between Polyethylene Material and the Finished Product?"

As additional and improved Polyethylene plastics production comes into being... we think chances are good that you will use this miracle material to the advantage of your product's performance and appearance.

Polyethylene plastics have many plus factors—it has low specific gravity, being lighter in weight than most plastics—it has excellent electrical properties making it valuable for electronic uses—it has low moisture transmission, chemical inertness, and flexibility and toughness. It can be made into translucent products or carry the spectrum with high lustre. Structurally it offers many advantages in a wide range of uses and applications.

The gap that lies between the manufacture of Polyethylene materials and the finished product—ready for application—is the all important role of the American Agile Corporation. Backed by years of experience in working with Polyethylene, we believe American Agile's methods and techniques can save you both time and money in your use of this proved plastic material. May we work with you?

Fabricators and Processors of Polyethylene—for Industry

• AMERICAN AGILE CORPORATION •
• 5461 Dunham Road • Maple Heights, Ohio •

Established in 1932

AGILENE AGILIDE

little things count...

in making vinyl floor tile, too!

Small amounts of the *right* kind of stabilizers, carefully calculated to fit your production methods and tile formulations, can greatly improve heat and light stability and resistance to sulfur-staining ... assuring longer service life and customer satisfaction. May we help you?

Ferro Vinyl Stabilizers

FERRO CHEMICAL CORPORATION • BEDFORD, OHIO

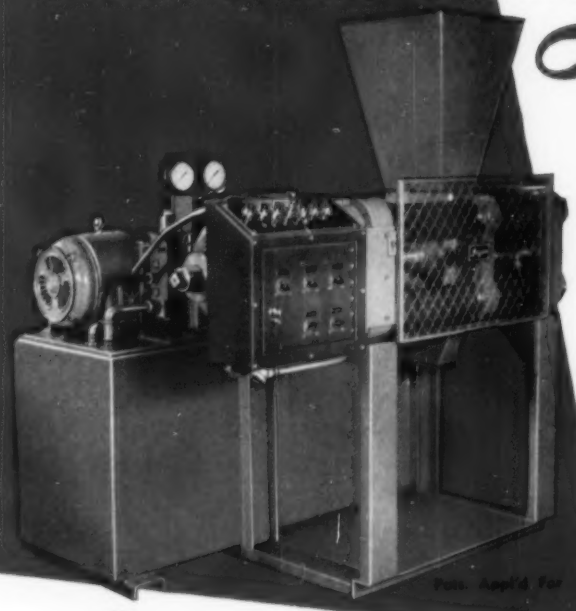
A Subsidiary of Ferro Corporation

FERRO

Stool from Modern House, Cleveland, O.

ON PHENOLICS OR
MELAMINE AND UREA
GRANULAR OR "FINES" THE.....

Logan HYDRAULIC PREFORMER WILL REDUCE COSTS



Horizontal design permits gravity discharge, minimizing breakage and damage to preforms. It also makes possible automatic preforming of impact type materials rapidly and accurately. Operation is practically dust free. Rods and guides are fully enclosed. Ideal for automatic preforming of Melamine and Urea "Fines".

AVAILABLE IN THESE TON CAPACITIES

30	60	125	160
200	240	280	330

Logan HYDRAULIC PRESSES

CUSTOM ENGINEERED FOR COMPRESSION AND TRANSFER MOLDING

Fast, low cost production follows the selection of a Logan Hydraulic Press. In the new line of Logan Presses are a wide choice of self-contained hydraulic, fast traverse, governed pressures with up or down stroke, top or bottom transfer and with semi-automatic precise controls as well as other features that will shrink your production costs. Complete range is from 10 to 400 tons.

Write for complete data on Logan equipment before you buy.

MADE IN FOUR POST DESIGNS, "C" FRAME STYLES, SPECIAL APPLICATIONS "FOR YOUR JOB"

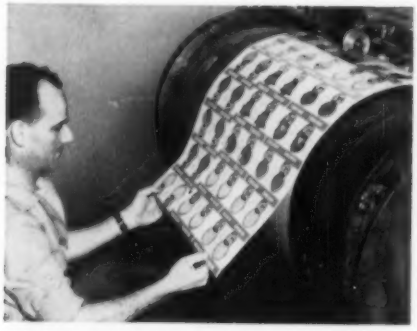
HYDRAULIC DIVISION
LOGAN ENGINEERING CO.
4901 WEST LAWRENCE AVENUE · CHICAGO 30, ILLINOIS

INTRODUCING... Versamid

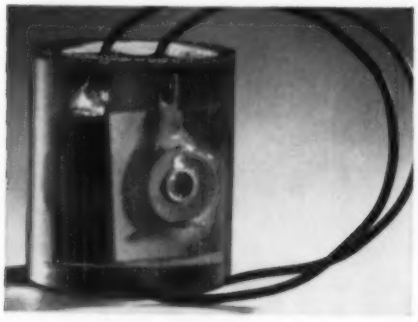
GENERAL MILLS TRADE NAME FOR VERSATILE POLYAMIDE RESIN

General Mills polyamide resins have become so popular in industrial uses, they need and deserve a name of their own. So, General Mills has adopted the trade name "Versamid" for its polyamide resin. The extreme versatility of these resins amazes nearly everyone. You'll appreciate why when you try them yourself. On the next page, you will find brief descriptions and some of the uses for General Mills line of Versamids. For more information, use the coupon lower right.

HOW TO USE *Versamids* FOR PROFITABLE PRODUCTION



Coating paper posters or labels with Versamid, as above, results in a non-blocking film that proves a strong barrier against moisture-vapor penetration.



Tough, bubble-free Versamid-epoxy blends work wonders for electrical embedments, above. They have negligible shrinkage and high dielectric strength. Other special features are low exotherm, long pot life, excellent thermal shock resistance.

Only a few years new, Versamids already have won a big place for themselves in industry. For here are safe, easy-to-use resins that appeal to everyone in the plant—from workmen to formulators. Ask yourself if you can't use these outstanding features:

Versamids require no toxic, volatile or explosive curing agents, even when blended with epoxy resins for special properties. Nor are any volatile reaction products produced during curing. Also, we know of no cases of toxicity or dermatitis caused by Versamids.

They're compatible, too—with each other and with a large number of modifying agents. This allows them to fit your needs exactly. You can blend Versamids to control resin hardness, flexibility, gloss, melting point, heat-sealing temperatures and range, tackiness, and other properties. To extend their versatility further, you can get some Versamids uncompounded (to add plasticizers, waxes, modifying resins) or compounded (for other special properties).

Versamids have sharp melting points. Thus, they heat seal easily, set up quickly without blocking. They resist grease and oil, moisture, wax emulsions, anti-freeze, detergents, alkalis, mild acids, and many solvents and common corrosive chemicals. They may be held at high temperatures for long periods without harm, and are stable for long-term storage.

THERMOPLASTIC USES—Versamids are popular because they meet the needs of a remarkable range of uses. In thermoplastic form, they prove ideal for inks, packaging, overprint varnishes, paints . . . plus flexible adhesives or coatings for paper labels, metal foil, plastic bottles, leather goods, publication covers, and many more—often replacing expensive laminations.

THERMOSETTING USES—When blended with epoxy resin, the Versamid blends are thermosetting and exhibit a whole new range of valuable properties. They're tough and economical, have great adhesion, and resist many corrosive chemicals. They offer low exotherm, high dielectric strength, good heat and color stability, and show a longer pot life than an equivalent mass of monomeric amine-cured resins. As Versamid blends cure quickly, amber clear and relatively bubble free, they improve performance characteristics of glass laminates, pottings and castings, plastic tools and dies, to name but a few.

JUST OFF THE PRESS! New booklet describes each Versamid in detail. Tells where to use them and why. For your free copy write to General Mills or mail the coupon below.

We also manufacture Fatty Nitrogen Compounds and Fatty Acids.

SEND THIS COUPON ▶

PROGRESS THRU RESEARCH

General Mills, CHEMICAL DIVISION, KANKAKEE, ILLINOIS

I am interested in investigating the use of Versamids for _____

_____

Please send me a free copy of your polyamide resin booklet, "Versamids . . . a Demonstration in Resin Versatility."

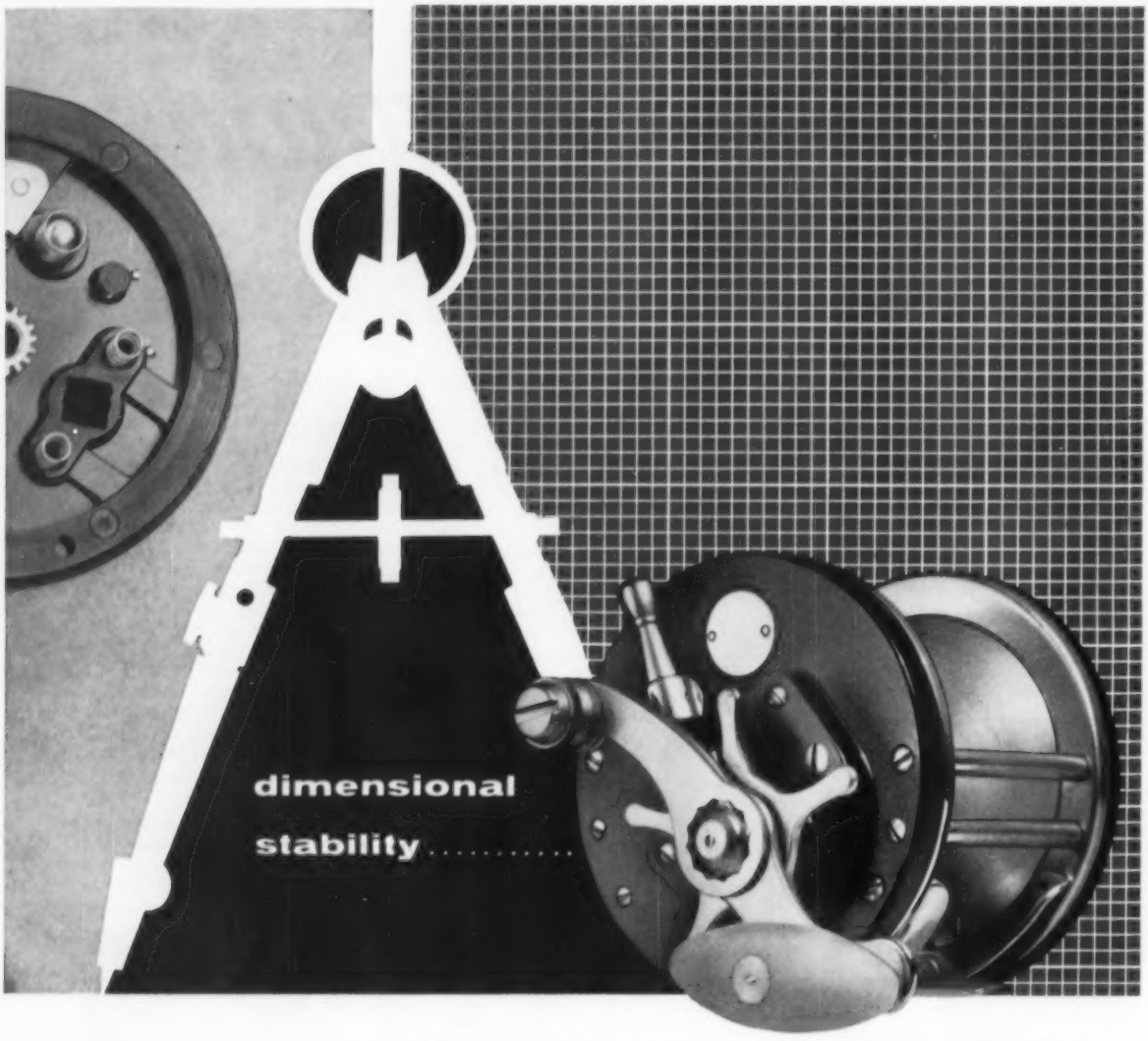
NAME _____

FIRM _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

MP 11/55



mold it with DURITE GP-102

This salt water fishing reel is an excellent example of products with molded plastic parts that require the consistent *dimensional stability* provided by DURITE GP-102. Its plastic side plates have numerous openings to accommodate intricate gears and mechanisms that must be seated perfectly if the reel is to function properly. Uncontrolled shrinkage or distortion can make assembly of the reel impossible.

Molders who have a problem of dimensional stability rely on DURITE GP-102. This pace-setting phenolic molding compound assures uniform accuracy in every piece you mold. It is carefully controlled from raw materials to the finished compound . . . batch to batch uniformity is assured. In addition, the fast cure of DURITE GP-102 can provide higher output per press.

Whether the moldings you make are large or small, intricate or simple, thin-walled or heavy-sectioned . . . it will pay you to give DURITE GP-102 a trial run. For a sample (either black or brown), or to have a Durite technical representative make the demonstration, write: The Borden Company, Chemical Division, Durite Products Dept. MP-115, 5000 Summerdale Ave., Philadelphia 24, Pa.

DURITE

©T. B. C.

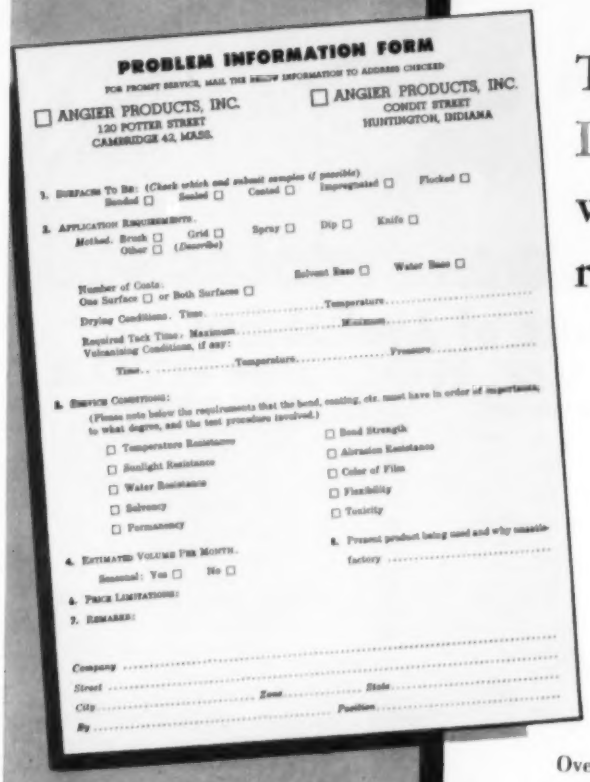
THE *Borden* COMPANY

CHEMICAL DIVISION

Phenolic Molding Compounds • Abrasive and Frictional Bonding Resins • Molding and Specialty Resins • Lamp Basing Cements

ANGIER PRODUCTS INC.

this is the sign of
a CUSTOM SERVICE
for your adhesive, coating
and sealer problems



PROBLEM INFORMATION FORM

FOR PROMPT SERVICE, MAIL THIS BELOW INFORMATION TO ADDRESS CHECKED

☐ ANGIER PRODUCTS, INC.
120 POTTER STREET
CAMBRIDGE 42, MASS.

☐ ANGIER PRODUCTS, INC.
CONDIT STREET
HUNTINGTON, INDIANA

1. SURFACES To Be: (Check which and submit samples if possible)
Bonded ☐ Sealed ☐ Coated ☐ Impregnated ☐ Flocked ☐

2. APPLICATION REQUIREMENTS.
Method. Brush ☐ Grid ☐ Spray ☐ Dip ☐ Knife ☐
Other ☐ (Describe)

Solvent Base ☐ Water Base ☐

Number of Coats:
One Surface ☐ or Both Surfaces ☐

Drying Conditions. Time..... Temperature.....

Required Tack Time: Maximum..... Minimum.....

Vulcanizing Conditions, if any:
Time..... Temperature..... Pressure.....

3. SERVICE CONDITIONS:
(Please note below the requirements that the bond, coating, etc. must have in order of importance, to what degree, and the test procedure involved.)

☐ Temperature Resistance
☐ Sunlight Resistance
☐ Water Resistance
☐ Solvency
☐ Permanency
☐ Bond Strength
☐ Abrasion Resistance
☐ Color of Film
☐ Flexibility
☐ Toxicity

4. ESTIMATED VOLUME PER MONTH.
Seasonal: Yes ☐ No ☐

5. Present product being used and why unsatisfactory.....

6. PRICE LIMITATIONS:

7. REMARKS:

Company.....
Street.....
City..... Zone..... State.....
By..... Position.....

This is the PROBLEM
INFORMATION FORM
which we invite you to
request for faster service

FOR EVERY INDUSTRY

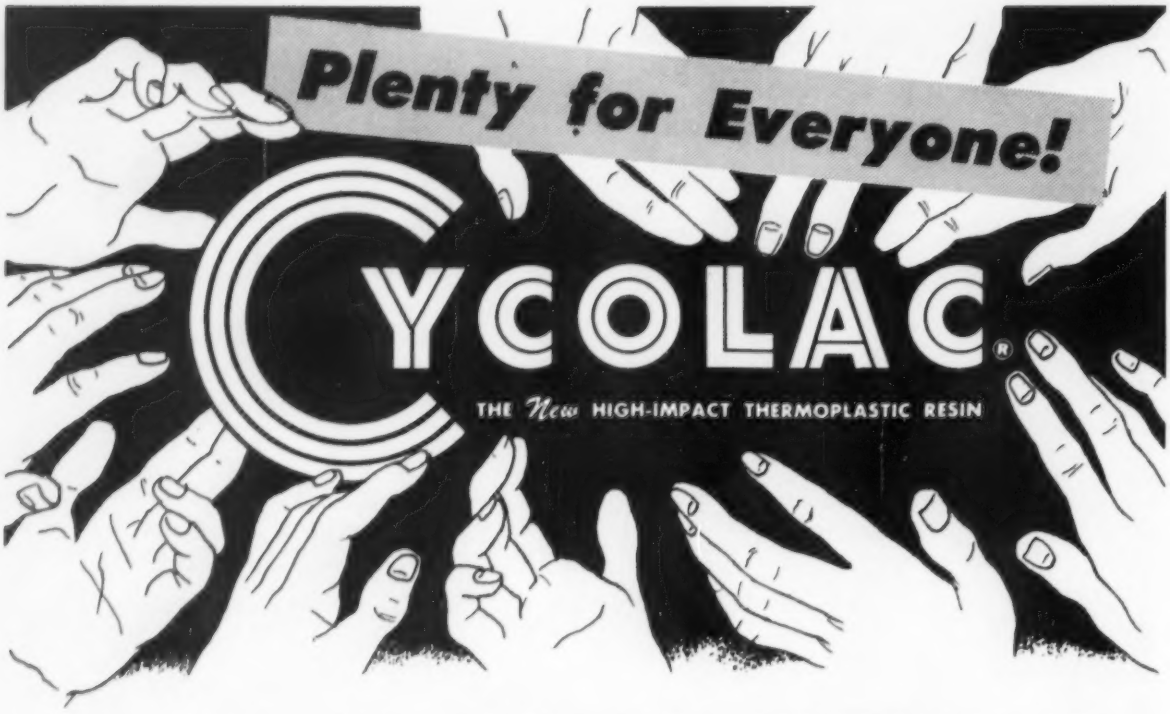
Latest Developments in Adhesives
for Honeycomb Construction
and Mylar Film Bonding
Rubber, Latex and Resin Cements
Pressure Sensitive Cements
Laminants and Sealants
Tie Coats Resin Emulsions

Over 20 years of formulation compounding to fit world needs for adhesives, coatings and sealers in every industry. Try Angier Products for individualized, custom service. Prompt delivery to all major cities in the East and Midwest.

Write Dept. A at the nearest Angier Products Plant for your PROBLEM INFORMATION FORM

Angier Products

120 POTTER STREET, CAMBRIDGE 42, MASS.
Midwestern Plant: Huntington, Indiana



Every Manufacturer Can Order CYCOLAC with Complete Assurance of Availability

CYCOLAC is a single uniform resin which is permanently thermoplastic, permitting fast molding, calendering and extruding and re-use of trim and cutting scrap. Also economical to form from sheet stock by vacuum, air-pressure, or mechanical methods over inexpensive molds of wood, plaster, aluminum, etc.

CYCOLAC is free from nerve or shrinkage; with high impact-resistance and heat distortion temperature, plus a low brittle point. Resistant to many oils, solvents and corrosive chemicals.

CYCOLAC is very light — Sp. Gr. 1.01 . . . dimensionally stable . . . soluble in selected solvents, for potential coatings applications. Readily injection-molded, extruded and calendered.

A FEW EVALUATED END USES FOR CYCOLAC

- Vacuum Sweeper Cover
- Clock Radio Cabinet
- Bowling Pin
- Lawn Mower Wheel
- Pipe Fitting
- Television Tube Holder
- Golf Club Heads
- Electronic Coil Form
- Calendered Sheets
- Extruded Piping
- Safety Helmets
- Lawn Sprinkler Heads
- Saw Handles
- Automobile Armrest
- . . . and so many more!

GET THE FACTS — *Write* TODAY for complete TECHNICAL LITERATURE

Marbon®

MARBON CHEMICAL

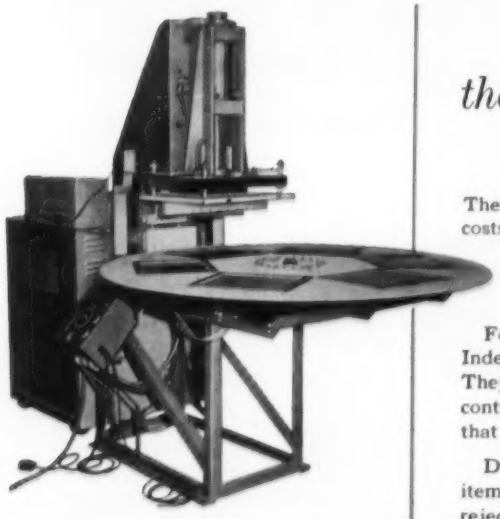
Division of BORG-WARNER CORPORATION

GARY, INDIANA

MARBON . . . Precision Resins for Precision Made Products

AUTOMATION by Thermatron

HIGH FREQUENCY SEALING AND HEATING EQUIPMENT



the fast, more profitable way to weld vinyl plastics!

The watchword today is *automation* to increase production, lower costs and improve quality . . . And for fabricators of vinyl plastics, Thermatron offers the best in fully automatic electronic welding equipment for large and small consumer novelty and industrial products.

For example, the illustration shows a Thermatron Automatic Indexer used with a Thermatron Generator and large P-36 Press. They feed, index, weld and rewind complete rolls of vinyl in one continuous operation. You just flip the starting switch. From that point the machine takes over on its own!

Discover for yourself how Thermatron can weld your plastic items at high speed with constant quality and practically no rejects. Write today for full details including our trade-in offer on your old equipment . . . And ask for a copy of bulletin 98.

Thermatron Division

RADIO RECEPTOR COMPANY, INC.

In Radio and Electronics Since 1922

SALES OFFICES: 251 West 19th St., New York 11, N. Y., WAtkins 4-3633 • *Chicago: 2753 West North Ave.*
Los Angeles: Electroseal Plastics Company, 130 North Juanita Ave. • *FACTORIES IN BROOKLYN, N. Y.*

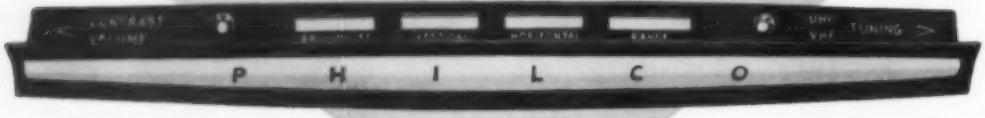
OTHER RADIO RECEPTOR PRODUCTS: Radar, Navigation and Communications Equipment; Selenium Rectifiers; Germanium and Silicon Diodes

TRADE ERIE MARK plastics

STRIKES AGAIN with their NEW EXTERNAL METALLIZING on CUSTOM MOLDED PLASTIC PARTS

CUSTOM MOLDED CLOCK PARTS

RADIO-TV KNOBS



RADIO-TV TUNING PLATES

For applications involving metallized surfaces ERIE PLASTICS offers their new External Metallizing to plastic as the economical way to achieve the richness and lasting luster equal to electro-plating on metal.

This new Top Surface Metallizing technique provides a finish which looks and acts like metal plating, combining practicality with lasting beauty in functional ornamental parts. Many special color effects can be obtained to suit the customers' requirements. It will not tarnish, pit, or rust, and maintains its brilliance under adverse weather conditions.

In achieving the effect an evaporated metal film is deposited on a specially developed, firmly adherent, tough organic undercoat, and is then protected by a clear and marresistant topcoat.

After extensive development ERIE engineers and designers have perfected an exclusive finish able to meet the rigid requirements of customers such as PHILCO and GENERAL ELECTRIC — TELECHRON Clock. The External Metallized finishes are required to pass score-and-tape tests, as well as humidity, fading, and thermal shock tests.

ERIE Sales Engineering Department is available to help solve your metallizing problems.

TRADE ERIE MARK plastics

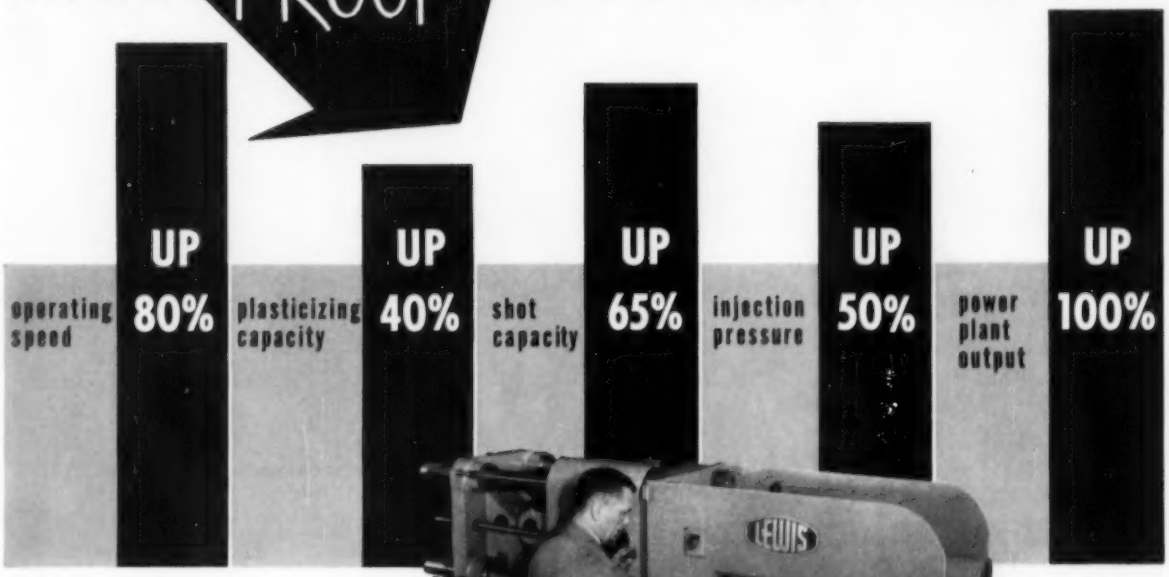
ERIE PLASTICS DIVISION
ERIE RESISTOR CORPORATION
Main Offices and Factories: **ERIE, PA.**
Manufacturing Subsidiaries
HOLLY SPRINGS, MISSISSIPPI • LONDON, ENGLAND • TRENTON, ONTARIO

Only the name is the same! The redesigned LEWIS "4" is a completely new machine. Its increased performance boosts it into a class of its own . . . small in size, price and operating costs but equal to much larger machines in actual capacity and accuracy.

Here are the facts. New 6-second dry cycle. New 50 pound per hour plasticizing capacity. New injection pressures (up to 21,200 p.s.i.). New shot capacity of 5 ounces (polystyrene). New 10 h.p. motor. New 22 g.p.m. hydraulic pump. And . . . the largest platens in its class . . . 14" x 12½" between the rods. For high volume production, the LEWIS "4" can easily be converted for fully automatic operation. Safety features include electrically interlocked gate and an emergency stop.

Compare these new performance figures with other molding machines of comparable or larger size. You'll quickly see why the redesigned LEWIS "4" is your best buy dollar for dollar. AND . . .

. . . THE PROOF IS IN YOUR PROFIT!

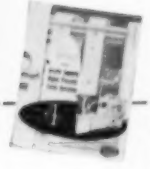


WITH THE

REDESIGNED LEWIS "4"

LEWIS

THE LEWIS WELDING & ENGINEERING CORPORATION
11 INTERSTATE STREET • BEDFORD, OHIO



LEWIS WELDING
& ENGINEERING CORP.
11 Interstate Street • Bedford, Ohio

Please send me a copy of BULLETIN 104 describing the redesigned LEWIS "4" injection molding machine.

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE ___ STATE _____

6576-LW

ONLY THE LEWIS "4" GIVES ALL THIS AT ONE LOW PRICE

We help keep your products moving!

Specialized Bridgeport Techniques mold your products better, more economically . . . *speed them to market faster!*

Bridgeport slashes ordinary time and labor-consuming steps in assembly, finishing, spraying, drying and other secondary operations of plastic molding. Special tools and techniques improve overall efficiency. Your products *move faster to market at less cost!* Write today for full details.

BPM **BRIDGEPORT MOULDED PRODUCTS, INC.**

BOX 3276, BARNUM STATION, BRIDGEPORT 5, CONN.

Monsanto's versatile line of plasticizers meets every need from film . . . to floor tile

S-160 . . . Santicizer 160, the lowest-cost primary plasticizer, offers excellent heat and light stability, grease, oil, water and stain resistance. In addition, this product possesses excellent fusion characteristics and imparts good low-temperature flexibility to PVC compounds. Handles large quantities of fillers well. Widely used alone and in combination with other plasticizers such as DIDP.

DIDP . . . Compounds plasticized with diisodecyl phthalate possess excellent flexibility, retention of physical properties after severe heat aging, good plastisol viscosity stability and resistance to extraction by soapy water. In addition, they have lower pound-volume cost, volatility, and alkali extraction than DOP. Blends well with S-160.

S-606 and **S-613** (mixed phthalates) . . . Blends of S-160 and DIDP combining, at an attractive price, the best properties of each plasticizer. They also have better grease and stain resistance and faster processing than DOP with comparable volatility. Specially suited for vinyl floor tile.

S-141 . . . Santicizer 141 is an excellent *nontoxic* plasticizer offering superior flame retardance and the same low-temperature flex as DOP, *plus* improved light stability, stain and oil resistance and faster fusion and processing characteristics. Used in food wrapping, paper coating, film, sheeting. Pound-volume cost is less than the phosphate esters such as TCP. Made only by Monsanto!

Santicizer: Reg. U. S. Pat. Off.

FOR MORE FACTS on S-141, S-160, DIDP, S-606 and S-613, mail coupon below.

Serving Industry . . . Which Serves Mankind

MONSANTO
CHEMICALS — PLASTICS

Organic Chemicals Division
MONSANTO CHEMICAL COMPANY
Box 478-E-6, St. Louis 1, Mo.

Please send facts on:
☐ S-141 ☐ S-160 ☐ DIDP ☐ S-606 and S-613

Name .....

Address .....

City ..... *State* .....

INJECTED or EXTRUDED

PECO 2½" Universal Extrusion Machine

PECO 30m Injection Moulding Machine

PECO MAKE THE MACHINES -THAT DO THE JOB

Peco Injection Moulding Machinery is now well established throughout the world as equipment in which the best engineering skill and experience are combined with the latest developments in plastic technology.

A recent addition to the PECO range of machines for the plastics industry is the 2½" Universal Extrusion Machine which is illustrated above.

Illustrated literature is available on all PECO products and will be gladly sent on request.

PECO PRODUCTS

PECO MACHINERY SALES (Westminster) LTD.

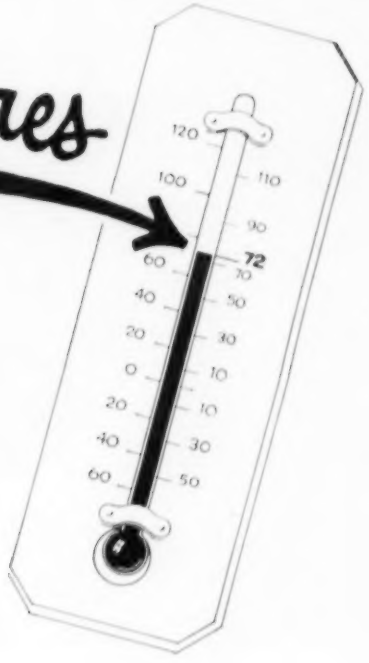
28, VICTORIA STREET :: LONDON, S.W.I. :: ENGLAND

Telephone ABBey 1793/4/5 Telegrams: PROFECTUS SOWEST LONDON Cables: PROFECTUS LONDON

THE PROJECTILE & ENGINEERING COMPANY LTD ACRE STREET, LONDON, S.W.8

Now—You can dissolve high molecular weight polyvinyl chlorides

at room temperatures



Du Pont TETRAHYDROFURAN gives high solids content at practical working viscosities

Tetrahydrofuran (THF) may be the key to a new or better selling product for you.

Here's an example. Adhesives made possible with THF have given manufacturers just what was needed to join PVC to PVC with a bond virtually as strong as the original materials. Result: new polyvinyl chloride products such as multi-purpose bags; a faster, easier way of joining plastic pipe and a stronger, better line of toys.

The unique solvent power and low boiling point of THF are opening doors to many other new and improved products. Fabric coatings, plastic sheet coatings, printing inks and lacquers are just a few. There will be many more.

If you think a powerful solvent for polyvinyl chlorides and other vinyl resins may help you improve your product or build a new one, we will be glad to send you more information about tetrahydrofuran. Just write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

PHYSICAL PROPERTIES:

Appearance	Colorless, mobile liquid
Odor	Ether-like
Molecular weight	72.10
Freezing point	-108.52°C.
Boiling range	65-67°C.
Flash point (Tag closed cup)	6°F.
Vapor pressure, mm Hg. at:	
25°C.	176
45°C.	385
65°C.	760
Solubility	Miscible with water. Soluble in most organic solvents.

Du Pont can assure you prompt delivery of tetrahydrofuran in tank car quantities.

Mail coupon for more information

DU PONT
TETRAHYDROFURAN

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Please send me more information on tetrahydrofuran for use in the following applications:

_____
_____
_____
_____
_____

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department MP-11
Wilmington 98, Delaware

Name _____
Position _____
Firm _____
Address _____
City _____ *State* _____

Egan

polyethylene extruder-laminator

(Above pictured installation at the Milford, N. J. plant of RIEGEL PAPER CORPORATION)

COMPLETE PACKAGED MACHINE

Combining in one unit, in engineered balance, two famous units—The Egan Extruder and the Egan Laminator. Planned for your current—or expanding—production, available in varying sizes—from 24" Pilot Plant Size to 96", 1000 feet per minute continuous operation. Machines are capable of coating on paper and paperboard, cellophane, foil, glassine and cloth.

35
30 **Egan machines now in operation.**
9
5 **Egan machines under construction.**

Approximately 75% of all polyethylene laminating machines now in operation anywhere in the world are Egan Equipment.

FRANK W. EGAN & COMPANY, Somerville, New Jersey

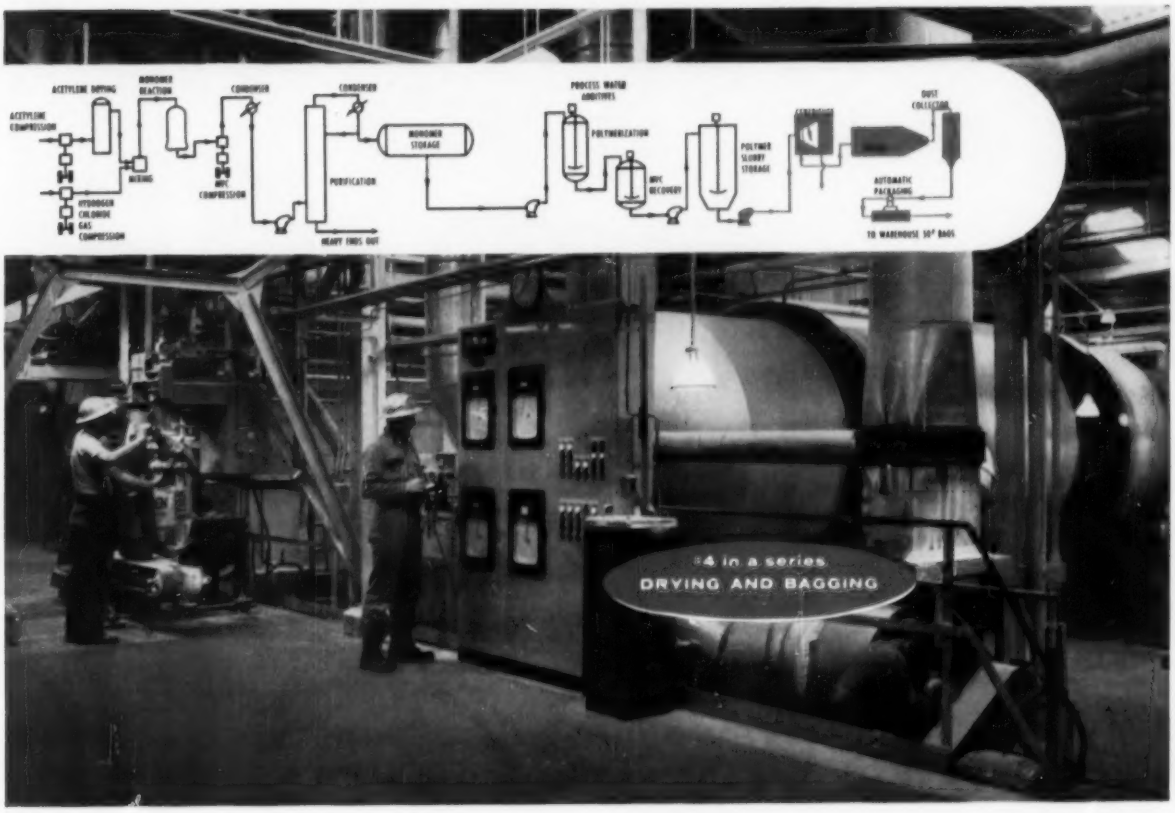
Designers and Builders of Machinery for the Paper Converting and Plastics Industries

Cable Address: EGANCO—SOMERVILLE (NJER)

Representatives: WEST COAST — John V. Roslund, 244 Pacific Bldg., Portland, Ore. MEXICO, D. F. — M. H. Gottfried, Avenida 16 De Septiembre, No. 10.

Licensees: GREAT BRITAIN — Bone Bros. Ltd., Wembley, Middlesex. FRANCE — Achard-Picard, Remy & Cie, 36 Rue d'Enghien Xe, Paris. ITALY — Emanuel & Ing. Leo Compagnano, Via Borromei 1 8/7, Milano. GERMANY — ER-WE-PA, Erkrath, bei Dusseldorf.

Another Quality Chemical by General Tire



How quality is built into Vygen*

Vygen polyvinyl chloride resin is ready for your most exacting requirements when it leaves this modern rotary drier. During this important process, temperature, volume of air and length of drying cycle are held in absolute critical balance . . . precision drying which is your final guarantee of stability and consistency.

Vygen is a new and completely dependable source for quality PVC, and is available in quantity. For samples, literature and technical assistance write to The General Tire & Rubber Company, Chemical Division, Akron, Ohio.

Chemical Division GENERAL
THE GENERAL TIRE & RUBBER CO.
VYGEN

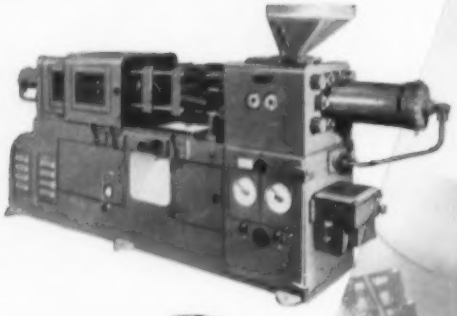
Creating Progress Through Chemistry

*T. M. G. T. & R. Co.

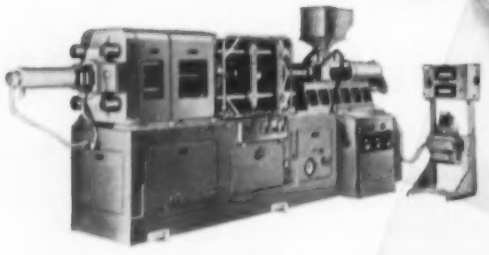
General Tire also produces . . .
Gen-Flo* (Paint Latex) • Gen-Tac* (Vinyl Pyridine Latex) • Kure-Blend MT® (Accelerator Masterbatch) • Glykon* (Polyester Resin) • Polystop® (GRS Shortstop) • Ko-Blend® (Insoluble Sulfur Masterbatch)

The Windsor R.C. 100 twin screw extruder is a medium capacity machine with a nominal output of 100 lbs. per hour and will produce tubes, rods and profile in most of the thermo-plastics materials.

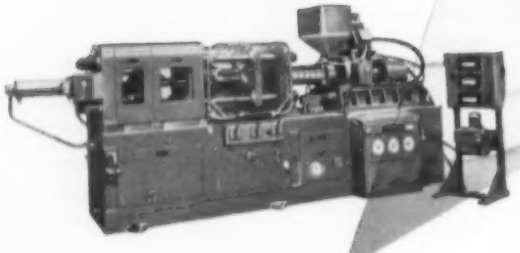
WINDSOR INJECTION MOULDERS & EXTRUDERS



The Windsor S.H.4 fully automatic injection moulding machine will produce articles in a wide range of materials up to four ounces. Mould locking force 150 tons. A mould safety device is incorporated.



The Windsor S.H.8/10 injection moulding machine will produce up to 12 ounce shots. A 300 ton lock and large mould plates ensure a wide production range.



The Windsor 1044 Autoplas Pre-Plasticiser capable of moulding up to 44 cubic inches (32 ounces C.A.). This model retains the features of the S.H.8/10 injection moulding machine, such as platen area 29″ x 25″ and the 25 H.P. motor drive, whilst giving a trebled capacity.

Office & Works:
LEATHERHEAD ROAD • CHESSINGTON • SURREY • ENGLAND

R.H. Windsor LTD

U.S.A. • F. J. STOKES MACHINE CO., PHILADELPHIA 20, PENNSYLVANIA
CANADA • WILMOD CO., PLASTIC DIVISION, 2488 Dufferin Street, Toronto

For PLASTICS — WORBLA

Manufacturers of plastics for over thirty years.

WORBLA-PLASTICS have proved their worth
So that you may see for yourself — we shall gladly provide you with samples.

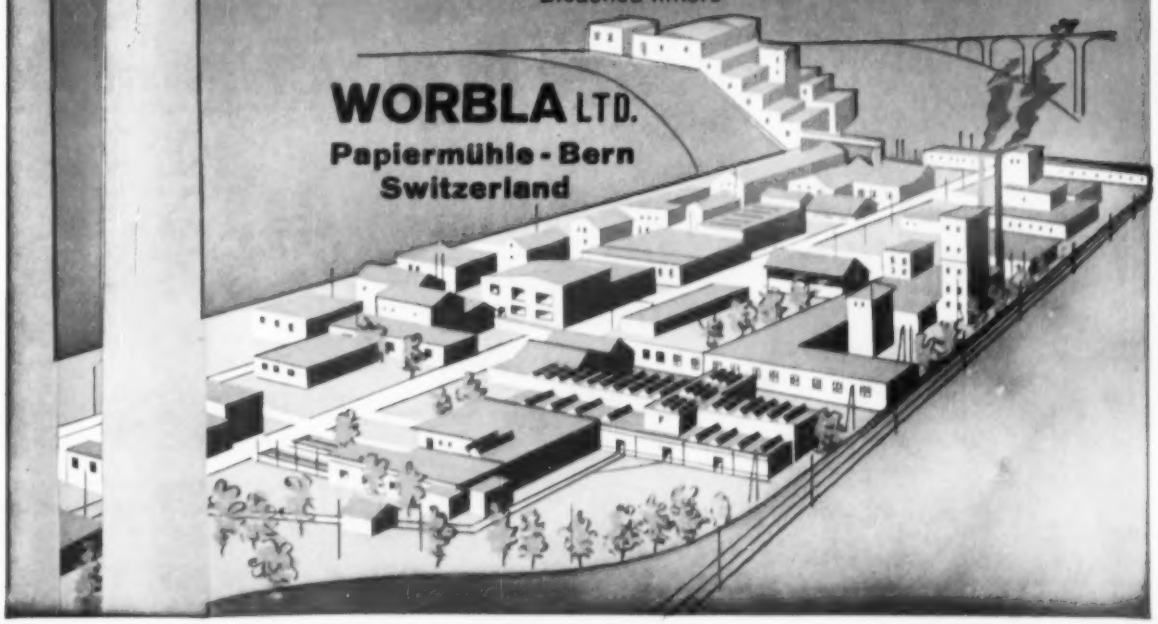
WOPALOID — Celluloid in sheets, tubes and rods.

WOPALON — Cellulose Acetate in sheets, tubes and rods.

WOPALIT — Acetate powder for injection moulding and extrusion.

WOPAVIN — PVC (Polyvinylchloride) in calandered and pressed foils and sheets, tubes, rods and profiles. Compounds for injection moulding and extrusion.

WORBLA — Nitrocellulose for lacquers and technical uses.
Bleached linters



WORBLA LTD.
Papiermühle - Bern
Switzerland

NRM Devolatilizing EXTRUDERS

NRM 3½" Electrically Heated
24:1 Le/D Ratio
Devolatilizing Extruder

INCREASE PROFIT ON PLASTICS PRODUCTION

3 important ways...

BY *ELIMINATING:*

- POROSITY* IN EXTRUDED MATERIAL
- UNWIELDY PRE-DRYING ATTACHMENTS
- EXTRA PASSES THROUGH THE EXTRUDER

2477

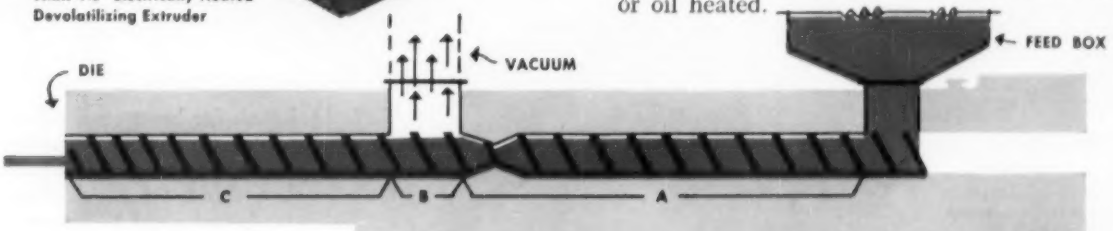
YOU SPEED PLANT OPERATION, PRODUCTION AND PRODUCE EXTRUSIONS OF HIGHEST QUALITY...

NRM Devolatilizing Extruders "short-cut" the time-taking, expensive methods of extruding on conventional machines such materials as cellulose acetate and butyrate, ethyl cellulose, acrylic and others. Since compounds like these require removal of moisture and other volatile constituents in order to produce non-porous, top quality extrusions, processing them can be done faster and less expensively on extruders designed especially for the work.

NRM 4½" Electrically Heated Devolatilizing Extruder

Where moisture only need be removed, pre-drying hoppers work well enough, although they are unwieldy, hard to manage and require excessive headroom. Where elements must be removed which reach evaporation point only inside the extruder, material must be extruded repeatedly — unless a means is provided to "vent" these constituents on the *first run*.

NRM Devolatilizing Extruders provide this means of "venting" volatile elements in the first run . . . The integrally-built cylinder vent illustrated in the accompanying sketch removes gases released by the plastic as it is plasticized. Additional heating and mechanical working of the plastic as it travels through the extra long cylinder assures highest quality extrusions, free from porosity. Because of a greater ability to disperse color, these extruders are also effective in cutting processing costs and increasing quality where colored compounds are extruded in any quantity. If you work with plastics requiring devolatilization, you can cut production costs, speed up the work and increase your ratio of profit with our Devolatilizing Extruders. While their design is special, they are *standard* in our line. They are obtainable in all sizes, and may be either electric or oil heated.



* *Volatile constituents in the plastic causing porosity are "vented" as follows: Plastic is heated, plasticized, and volatile elements brought to evaporation point in stage A. In stage B, plastic releases gases which escape through vent built integral with the cylinder. In stage C, material is further heated and worked, completing the extrusion cycle.*

ENCOURAGE OUR YOUTH To CONSIDER The OPPORTUNITIES In ENGINEERING and SCIENCE

NRM

NATIONAL RUBBER MACHINERY CO.

General Offices and Engineering Laboratories
47 West Exchange St., Akron 8, Ohio—HEmlock 4-3131
EASTERN PLANT: 384 Getty Ave., Clifton, N. J.—PAssaic 7-7500
SOUTH: The Robertson Company, Butland Building, Decatur, Ga.
WEST: S. M. Kipp, Box 461, Pasadena 18, Cal.—SYcamore 4-2116
EXPORT: Omni Products Corporation, 460 Fourth Ave., New York, N. Y.—LExington 2-1220

WRITE TODAY FOR MORE DETAILS, QUOTATIONS, OR TO ARRANGE A DEMONSTRATION. THERE'S NO OBLIGATION

2477

SEILON® RIGID PLASTIC SHEETS

ARE THE ANSWER TO CORROSION!

Seilon is easy to form, easy to work ...can even be welded. Look at these fabrication examples:

ABOVE: Multiple hood and duct exhaust system for handling highly corrosive fumes in plating operation. Fabricated entirely from Seiberling sheet material by Colonial Plastics Manufacturing Company, Cleveland, Ohio.

PRESS-LAMINATED SHEETS

standard sheet size: 48" x 96"... high and normal impact P.V.C. for corrosion applications ... decorative P.V.C. panels ... heavy-gauge formable high-impact P.V.C.

CALENDERED SHEETS

widths up to 51½"... superior high-impact polystyrene ... normal and high-impact P.V.C. for corrosion resistance ... and formable high-impact P.V.C. for vacuum forming.

EXTRUDED SHEETS

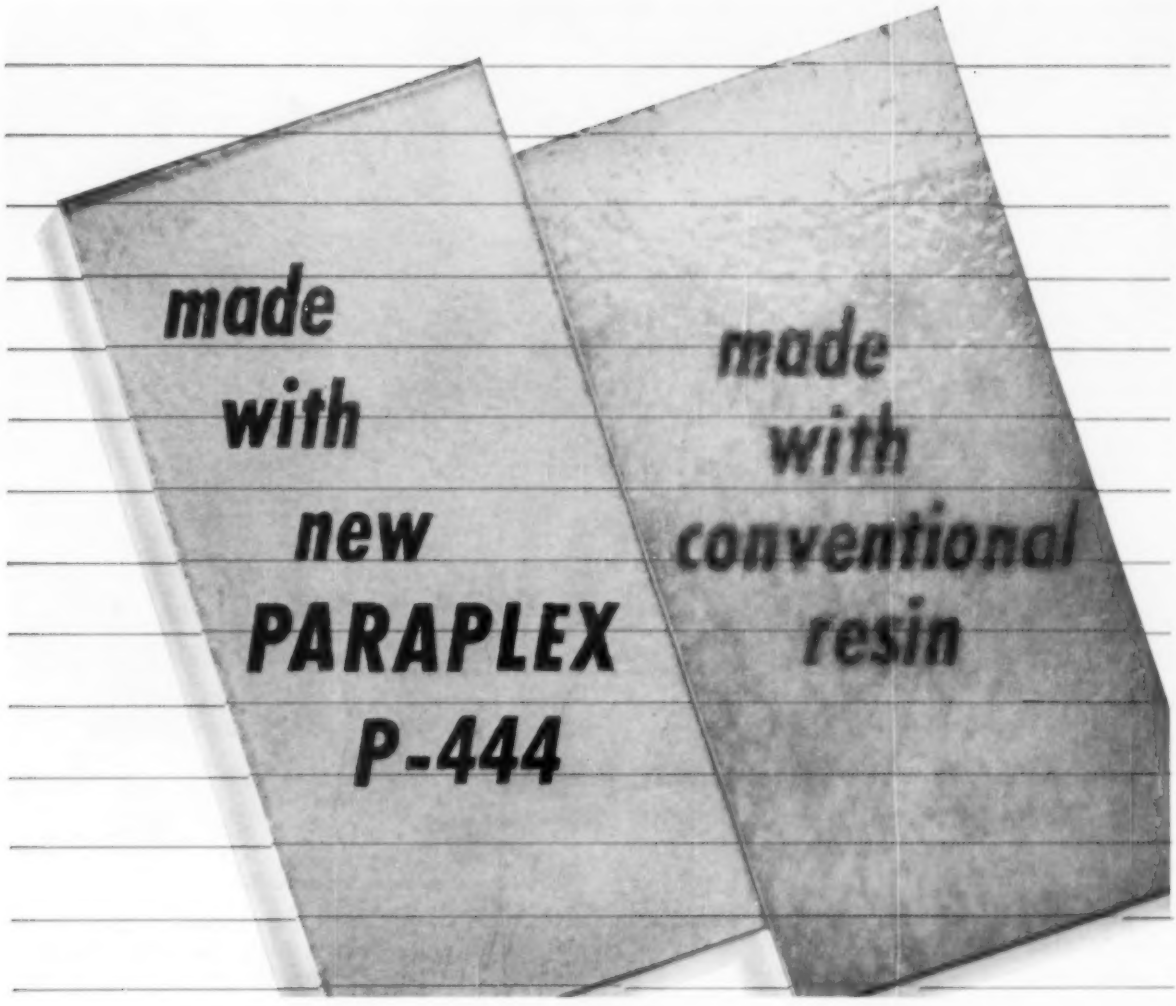
widths up to 48"... high-impact polystyrene.

LEFT: Acid tank for brassroom, fabricated from Seiberling sheet material by American Agile Corporation, Maple Heights, Cleveland, Ohio. Tank is 8'x3'x3' with ½" sides and ⅝" bottom. Sides are reinforced with gusseting. Includes valve and elbow, sheave, bearing assembly mount and agitator.

Seiberling Plastics Division is adaptable to customers' requests. We will welcome the opportunity to consult with you on individual specifications of properties, gauges, colors and finishes for your products. Delivery is prompt—can be made in 10 days to two weeks.

Plastics Division **SEIBERLING RUBBER COMPANY**

NEWCOMERSTOWN, OHIO • PHONE 8-8304



Cut down erosion, fiber evidence, and discoloration by using PARAPLEX P-444

PARAPLEX P-444, a new polyester-acrylic resin for glass-fiber reinforced materials offers these important advantages:

excellent wetting of and adhesion to glass fibers

refractive index of cured resin similar to that of glass

unusual resistance of cured resin to erosion by weather and discoloration by ultraviolet light

degree of transparency easily controlled.

PARAPLEX P-444 is recommended for corrugated panels, flat sheets, awnings, decorative sidings, and in other applications where good weatherability is required.

For further information about PARAPLEX P-444—and a sample, if you wish—write to Dept. WW3-5.

Chemicals for Industry

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries

PARAPLEX is a trade-mark, Reg. U.S. Pat. Off. and in principal foreign countries.

These clock faces give the appearance of costly metals. Actually, they are inexpensive plastic coated with aluminum under high vacuum. This covers the parts with a soft silvery finish, or . . . after a simple lacquering operation, the finish of burnished copper. Other lacquers provide a rainbow of colors to brighten your products and sales picture. The whole process is easy and economical.

"Vacuum metallizing gives us a much wider market for our molded plastics and additional profit for the operations performed after molding."

W. C. Conroy, Sales Manager
Plastics Division Erie Resistor Corporation

Erie Resistor Corporation, Erie, Pa., uses a battery of *CVC* vacuum coaters to give inexpensive plastic parts the rich finish of costly metals.

Coating parts with aluminum under high vacuum and applying various lacquers can give them the attractive appearance of gold, silver, copper, or a whole rainbow of other metallic colors.

The two clock faces shown above, for example, have the soft sheen of burnished copper and silver. Stringent tests (see below) show that the metallized finish is durable. Rough usage leaves its color and shine unmarred.

Vacuum metallizing is simple and inexpensive. A few hours training makes any of your help expert in the metallizing operation. Just a few ounces of aluminum covers thousands of parts. The process works as well with basic metals as with plastics.

You are welcome to share our experience in high-vacuum metallizing and associated lacquering operations.

We will be glad to discuss any particular applications with you.

Tests used by Erie Resistor on the metallized finish of the clock faces:

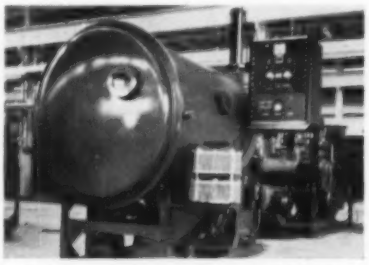
Scratch test. Cut cross-hatched lines approximately $\frac{1}{16}$" apart with sharp tool. Stick clear adhesive tape over the surface. When tape is removed, finish should remain on part.

Temperature shock. Place parts in 140° F. oven for two hours. Remove and place immediately in −20° F. cold chamber (air).

Humidity test. Expose parts to 120° F. for two hours and then to 92% R.H. at room temperature (86° F.). Four cycles of this exposure.

Fading test. Expose samples to ultraviolet light for 100 hours using a Corning 5" DCVX RDL-type filter with a G.E. 1000-watt, RH-4 mercury vapor lamp located 7" from the samples. No fading or discoloration should occur.

The above tests should not cause any observable change in the finished parts.



This 48" vacuum coater is one of three CVC production coaters used by Erie Resistor. Smaller sized models also available from CVC provide economical operation for short production runs. We deliver these units with all necessary equipment and controls—ready to install.

CVC

Headquarters for High Vacuum

Consolidated Vacuum Corporation Rochester 3, N. Y.

a subsidiary of CONSOLIDATED ENGINEERING CORPORATION, *Pasadena, California*

CVC sales now handled through Consolidated Engineering Corporation with offices located in: Albuquerque • Atlanta Boston • Buffalo • Chicago • Dallas • Detroit • New York • Palo Alto • Pasadena • Philadelphia • Seattle • Washington, D. C.

IF it drapes beautifully at low temperatures . . . and always stays color-perfect . . . somebody's added

Admex 744!

WHEN WINTER comes and frigid breezes blow, will everyone be happy with articles made from your vinyl sheeting? Raincoats, for example, can look and feel miserable if cold weather makes them stiff and wrinkled. And children's jackets. And automobile seat covers. And footwear. A host of plastic things!

But ADM has cold-insurance and color-insurance all in one package—in Admex 744. This is our newest epoxy-type plasticizer and stabilizer. It makes vinyls that stay flexible at –50° C.; and which, on the other hand, are color-stable when processed for 90 minutes or more at 375° F.!

For a startling demonstration of low-temperature flexibility, ask your ADM technical man to show you the "dry ice test". See an ordinary vinyl break, while an Admex 744 vinyl merely bends under pressure.

Want our Technical Bulletin 101C describing Admex 744, 710, 711 and/or evaluation samples? Just mail the coupon.

Admex
epoxy vinyl plasticizers

Ask to see the "DRY ICE" test...

Archer-Daniels-Midland company

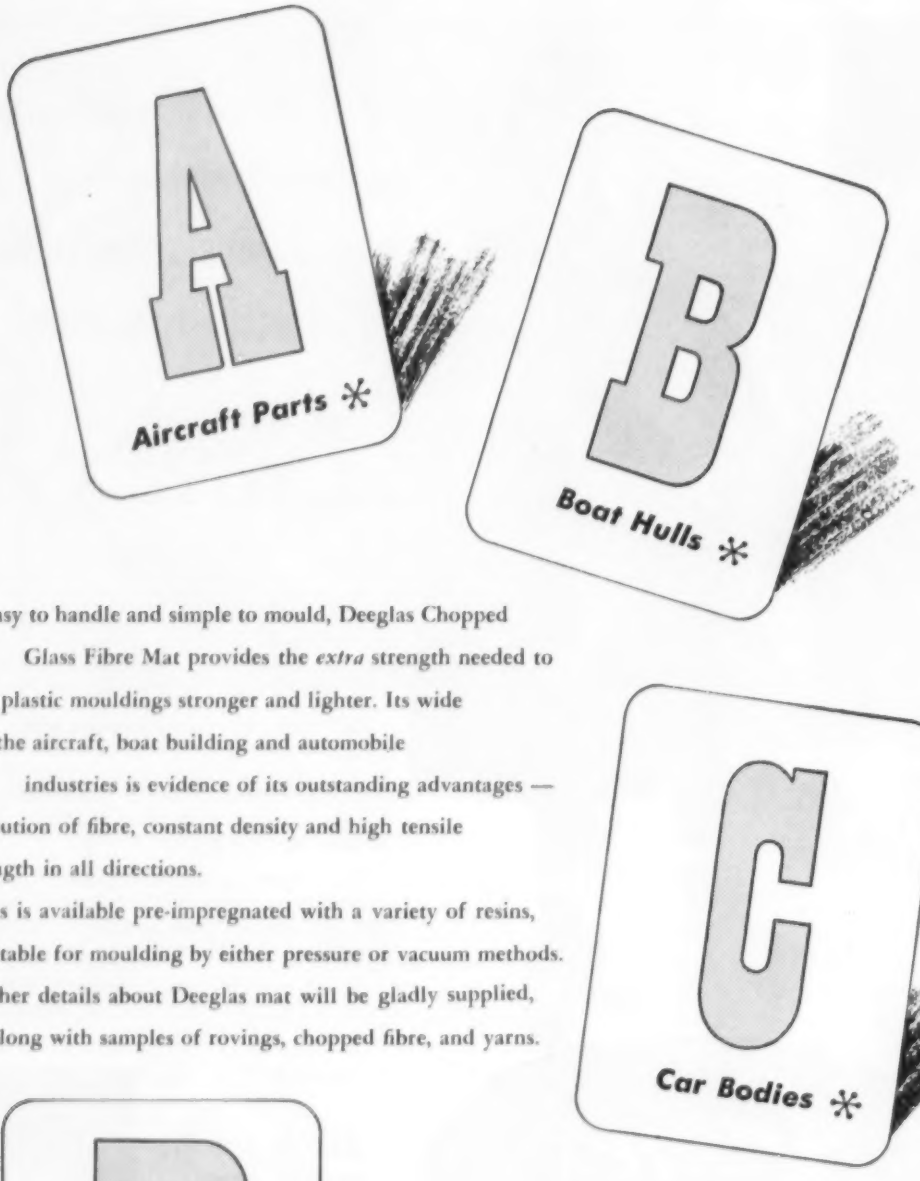
Other ADM products:

Linseed, Soybean and Marine Oils, Paint Vehicles, Synthetic and Natural Resins, Polyesters, Fatty Acids and Alcohols, Hydrogenated Glycerides, Sperm Oil, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa, Livestock and Poultry Feeds.

ARCHER-DANIELS-MIDLAND CO.
756 Investors Building • Minneapolis 2, Minnesota
Please send the following data:

- ☐ Information on Admex 744 (for extreme low-temperature flexibility)
- ☐ On Admex 711 (for maximum resistance to migration and exudation)
- ☐ On the 11 Admex 710 vinyl formulations

Name _____ Title _____
Firm _____
Street _____
City _____ Zone _____ State _____



Easy to handle and simple to mould, Deeglas Chopped Glass Fibre Mat provides the *extra* strength needed to make plastic mouldings stronger and lighter. Its wide use in the aircraft, boat building and automobile industries is evidence of its outstanding advantages — even distribution of fibre, constant density and high tensile strength in all directions.

Deeglas is available pre-impregnated with a variety of resins, and is suitable for moulding by either pressure or vacuum methods. Further details about Deeglas mat will be gladly supplied, along with samples of rovings, chopped fibre, and yarns.

Deeglas

GLASS FIBRE MAT

for better mouldings!

GLASS YARNS AND DEESIDE FABRICS LTD.

Craven House, 121 Kingsway, London, W.C.2. England.

Telephone: Chancery 7343

dioctyl azelate

dimethyl phthalate

di-(methoxyethyl) phthalate

di-isobutyl phthalate

diethyl phthalate

dibutyl phthalate

di-isobutyl adipate

triacetin

tributyrin

di-(2-ethylhexyl) adipate

dioctyl phthalate (DOP)

di-isooctyl phthalate (DIOP)

Eastman plasticizers

As a leading supplier of quality plasticizers, Eastman is pleased to announce the addition of di-isooctyl phthalate to its line. Manufactured from a new, improved type of isooctyl alcohol, this plasticizer possesses the excellent qualities for which the present Eastman plasticizers are noted. It is available in drum, tank truck and tank car quantities. DIOP is only one of the many fine plasticizers made by Eastman. For further information on any of the plasticizers listed above, write or call your nearest Eastman representative.

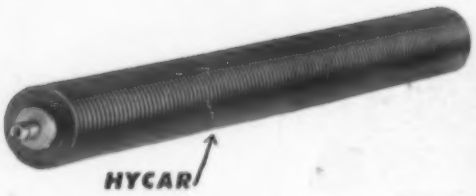
Eastman
CHEMICAL PRODUCTS, INC.,
KINGSPORT, TENNESSEE
subsidiary of EASTMAN KODAK COMPANY

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tenn.; New York—260 Madison Ave.; Framingham, Mass.—65 Concord St.; Cincinnati—Carew Tower; Cleveland—Terminal Tower Bldg.; Chicago—360 Michigan Ave.; Houston—412 Main St.; St. Louis—Continental Bldg. **West Coast: Wilson Meyer Co.,** San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Salt Lake City—73 S. Main St.; Seattle—821 Second Ave.

Another development using

B. F. Goodrich Chemical *raw materials*

Four o'clock ideas in the five o'clock mail



Roller made by the Ames Rubber Company, Hamburg, N. J., for the Heyer Corporation, Chicago, Ill. B. F. Goodrich Chemical Company supplies only the Hycar rubber.

IT'S four p.m. in your office . . . the phone rings. It's a report of a fast-breaking business situation—information you'd like to get into the hands of 300 distributors first thing in the morning. Can you do it?

You can, and Hycar helps turn the trick, with the efficient new spirit duplicator above. In an hour's time you can turn an idea into a full-fledged direct-mail campaign, complete with copy and illustrations in as many as five colors. Hairline register and positive feed are achieved with a spirally-grooved roll made from Hycar American rubber.

The designer specified Hycar for this important job because it keeps its shape and flexibility, resists wear, abrasion, and the deteriorating action of duplicating fluid. Hycar also resists lubricating oil, grease, and chemicals, maintains its unique physical properties over a wide range of temperatures.

Many parts and products owe their success to designers who know about the exceptional qualities of Hycar nitrile rubber. For complete information that will show what Hycar can do for you, please write Department CF-6, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
American Rubber

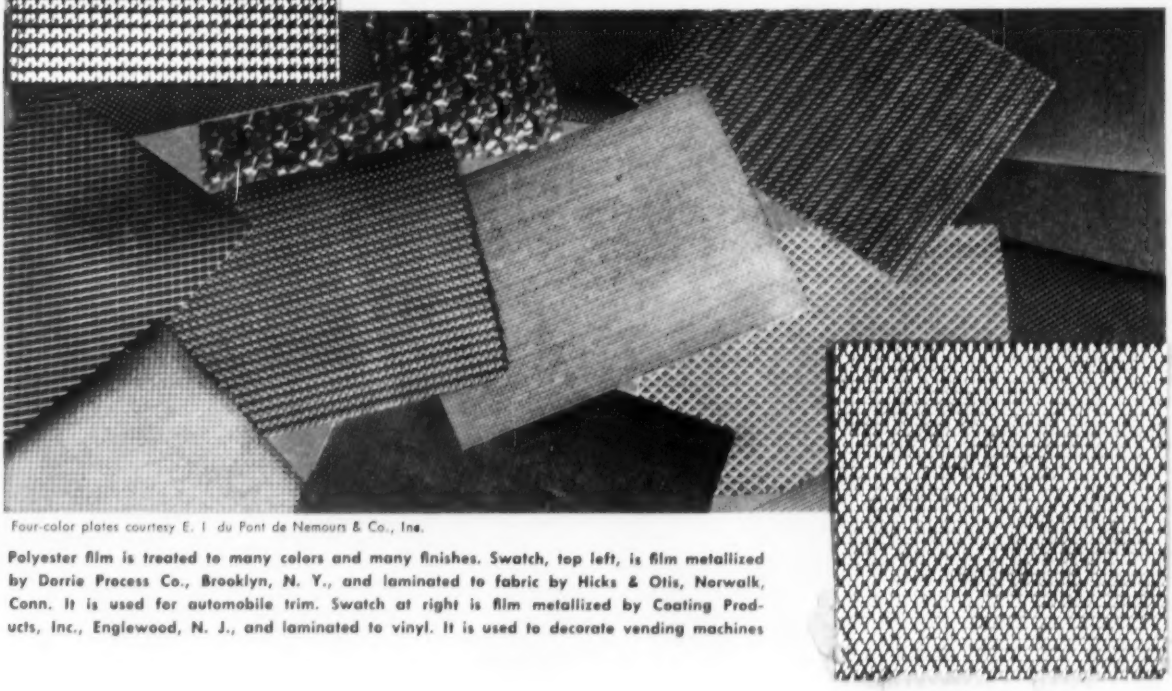
GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

MODERN PLASTICS

VOLUME 33 NUMBER 3 NOVEMBER 1955

Polyester film earns its title:

MIGHTY BEAUTY



Four-color plates courtesy E. I. du Pont de Nemours & Co., Inc.

Polyester film is treated to many colors and many finishes. Swatch, top left, is film metallized by Dorrie Process Co., Brooklyn, N. Y., and laminated to fabric by Hicks & Otis, Norwalk, Conn. It is used for automobile trim. Swatch at right is film metallized by Coating Products, Inc., Englewood, N. J., and laminated to vinyl. It is used to decorate vending machines

THE most exciting plastic intermediate product of the current year is probably a polyester film which possesses literally fabulous properties (see "The Fabulous Film," MODERN PLASTICS *32*, 110, Sept. 1954). Made to date only by E. I. du Pont de Nemours & Co., Inc., and trademarked Mylar, this film is produced from the condensation polymer of ethylene glycol and terephthalic acid and is the film or sheet version of Dacron polyester fiber.

The term "polyester" may be confusing to those who use it in reference to the styrenated and catalyst-activated resins which are combined with fibrous materials to produce reinforced plastics. This film is made of polyester of another breed. It is a high-melting, chemically stable, thermoplastic polymer, and is not chemically cross-linked.

It is far stronger than any other film yet made, with a tensile strength of 20,000 p.s.i., almost one-third that of machined steel. It has high impact strength and long flex life, remaining flexible and stable from —80 to 300° F. With this strength it is insensitive to moisture, resistant to solvents, and is unaffected by many acids and alkalies. It has good electrical insulation properties.

Now in mass production, this polyester film is being put to broader and more important uses than were originally conceived by the most violent enthusiasts. A simple fact is that the film can be metallized in various ways, can be laminated to literally anything, and can thus be used in combinations with lower-cost materials to produce superior products and applications.

The film is available in gages from ¼ mil up to 7½ mils and in roll widths from ½ in. to 50 to 55½ inches. Price in the most-used gages varies from $2.50/lb. for 1 mil which yields 15 sq. yd./lb., through $3.00/lb. for ½ mil which yields 30 sq. yd./lb., to $4.00/lb. for ¼ mil which yields 61 sq. yd./pound. Obviously, since the process of lamination to lower-cost materials is important to the increasing use of the polyester film,

the thinner gages are most popular.

The applications of this material outside of the packaging field (see "Polyester Film is Here," *Modern Packaging 28*, 98, July 1955) range from audio-video recording tapes to ladies' shoes, from chemical drum liners to gorgeous metallic fabrics, from electronic capacitors to toys, from building insulation to Hi-Fi speakers.

The problems in developing these uses were plenty, particularly where laminations to other materials were involved. Polyester film is highly inert and since it can ignore solvents, the development of adhesives was difficult. There was trouble with wrinkling in continuous lamination and at these prices laminators can't afford wrinkling. The quick shrink of the material at 150° C. in air which amounts to between 3 and 4%, was bothersome until designers learned how to use the shrink to advantage in certain applications where it could be shrunk into place around a component made of another material. Static was another problem, but static elimination had been overcome with previous films and equipment was easily adapted. A final problem was the imagination-stirring effect of samples on product designers and engineers, which brought about a situation in which no one knew what to try to do with it first.

Magnetic Tapes

Actually, sound-recording magnetic tapes offered the first field for big poundage. Three big faults were found in previous tapes made from thermoplastic resins: sensitivity to temperature and humidity, lack of great tear strength, and limitation on the amount of recording that could be placed on each reel. When the remarkable polyester tape moved into the market, its toughness and stability permitted the use of thinner gages. Reeves Soundcraft Corp., New York, N. Y., lengthened the sound barrier by producing a one-half mil oxide-coated polyester tape which doubles recording time by permitting a full mile of it to be wound on a 10½-in. reel. This allows for **19 hr. of continuous recording with a saving of 50% or more in storage space, a saving of 45% in weight, and safe storage under adverse conditions.**

Minnesota Mining and Mfg. Co., St. Paul, Minn., uses polyester backing for its "High Output" audio recording tapes, where stability under extremes of temperature and humidity is wanted. This company also treats wide sheets as backing for magnetic drum recording surfaces used in geophysical exploration.

Another company using Mylar as a magnetic tape base is ORRadio Industries Inc., Opelika, Ala., which specializes in tapes for electronic computers and telemetering. Its latest offering is a 2400-ft. tape on a 7-in. reel, doubling the recording time of standard equipment.

Coming up fast is audio-video tape and equipment for recording by magnetism sight as well as sound. Here the polyester has not yet progressed far, but surface of the film is being improved rapidly.

Typical of recent developments is the magnetic recording belt used by Felt and Tarrant Mfg. Co., Chicago, Ill., on its new Comptometer dictation machine. By using polyester film the maker can guarantee the belt for the lifetime of the purchaser.

Stronger Pressure-Sensitive Tapes

From recording tapes to tapes supporting adhesives for bundling, splicing, and masking was a fairly easy

First, and still a major industrial use of polyester film is as a base for audio and video recording tapes. Film makes it possible to double amount of recording on single reel

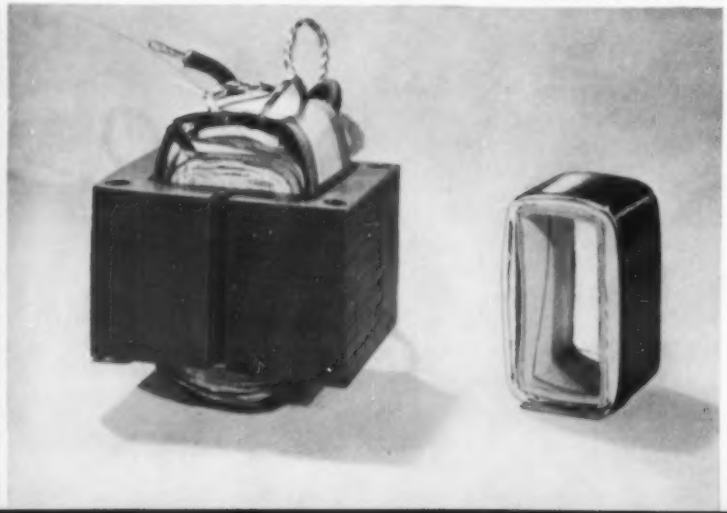
Courtesy Minnesota Mining and Mfg. Co.

Excellent electrical properties make polyester film ideal for slot liner insulation in electric motors

Courtesy E. I. du Pont de Nemours & Co., Inc.

Coil in transformer (left) is paper insulated; equivalent coil (right), insulated with thin, tough polyester film coated with white ink, is smaller, performs equally as well

Courtesy Insulation Mfrs. Corp.



Four-color plates courtesy E. I. du Pont de Nemours & Co., Inc.

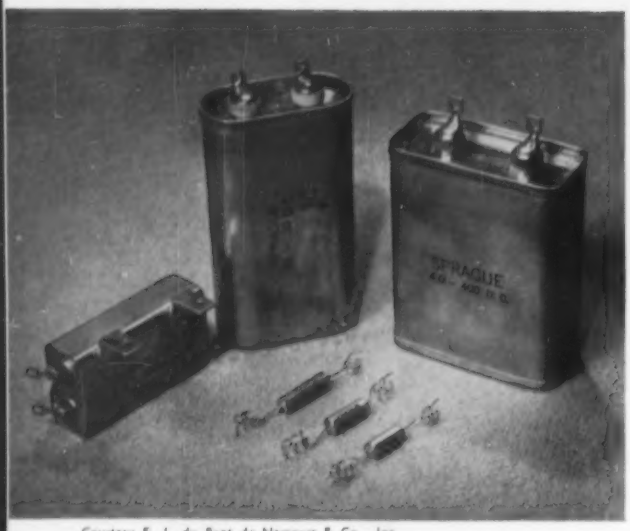
Dramatic demonstration of the outstanding tensile strength of polyester film

step. Here the polyester film provides great strength and good chemical and abrasion resistance. Indeed, it can sometimes eliminate fibrous reinforcement in packaging tape.

Electrical Applications

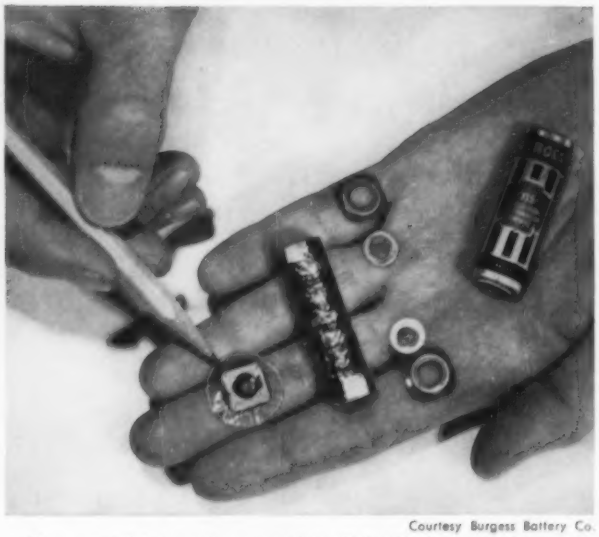
Because it can be made superthin yet strong, polyester film is a natural material for capacitor insulation. These units, so important to all electronic devices, may now be made smaller, yet can be operated over a wider temperature range than previously. Because the film won't tear or bind, the capacitors may be wound at higher speeds, with a saving in cost. The advantages of miniaturization of capacitors are illustrated by their use in a small electronic organ which contains 128 of them, and actually could not have been produced without their use.

The same powers of strength and electrical insulation led General Electric Co. to use polyester film as slot and between-coils insulation on a small fractional-horsepower motor. Since the film had 35 times the moisture resistance and 8 times the di-



Courtesy E. I. du Pont de Nemours & Co., Inc.

Small, compact capacitors using ¼-mil polyester film insulation can be made even smaller by replacing foil with metallized film



Courtesy Burgess Battery Co.

Tiny, powerful dry cells wrapped in Mylar-Pliofilm laminate and inserted in leakproof aluminum tube produce 2-in. high, 22½-v. battery

METALLIZERS

Coating Products
101 W. Forrest Ave.
Englewood, N. J.

The Dobeckmun Co.
P. O. Box 6417
Cleveland, Ohio

Dorrie Process Co.
60 Greenpoint Ave.
Brooklyn, N. Y.

Gomar Laboratories
79 Harris Street
Newark, N. J.

Hastings & Co.
2314 Market Street
Philadelphia, Pa.

Hy-Sil Mfg. Co.
28 Spring Street
Revere, Mass.

Minnesota Mining & Mfg. Co.
Reflective Prods. Div.
367 Grove St.
St. Paul, Minn.

National Metallizing Corp.
1145 19th St., N. W.
Washington 6, D. C.

Shellmar-Betner Div.
Continental Can Co.
Mt. Vernon, Ohio

M. Swift & Sons
10 Leve Lane
Hartford, Conn.

Vaporized Metal Coatings
Valley Road
Roosevelt, N. J.

electric strength of paper insulation, it was possible to make the motor 40% smaller and 50% lighter. Right now the National Electrical Manufacturers' Assn., which sets the standards for electrical products, is rerating the thinner insulations—because polyester film produced a revolution in electrical design.

In some cases laminations of this film with others costing less will be used to improve electrical equipment and make it smaller, with economy. An example is the new "Wafer Cell" dry battery developed by Burgess Battery Co., Freeport, Ill. In this unique battery, produced by automation, small wafers, or sandwiches of power-producing materials are stacked, wrapped in a Mylar-Pliofilm laminate instead of bulky paper tape, heat-sealed and inserted into a leakproof aluminum tube. The new battery, used in hearing aids, pocket radios, photoflash cameras, and in transistor-circuit electronic instruments, is 2 in. high, yet develops 22½ volts.

Mylar film, not in lamination, has lately been used to speed up production of insulated telephone wire by 35 to 46 percent. It is made by the Stromberg-Carlson Co., Rochester, N. Y. The new tinned copper wire has a tape winding of the polyester, then a serving of cotton yarn, then a coating of flame-resistant lacquer. The tape is half the thickness of the old insulation, but has more than twice its tensile strength. In addition, its melting point of about 475° F. makes it possible to solder through without stripping, after the cotton cover has been removed.

The good electrical properties of polyester film, plus its acceptance of adhesives without degradation, is bringing it into the electrical tape field. Newest products are two 2-mil electrical heat-curing tapes by Permacel Tape Corp., New York. These tapes have a tensile strength of 50 lb./in., elongation of 100%, an adhesion to steel of 40 oz./in., and a curing cycle of from 2 hr. at 250° F. to 1 hr. at 300° F. When cured, they are completely resistant to varnish and paint solvent. The adhesive is rubber-based, free of sulfur.

Stable Reproduction Material

In map work, drafting rooms, for templets and loftings, Keuffel & Esser Co., Hoboken, N. J., produces a new reproduction material, Stabilene film, by coating polyester film with light-sensitive solutions, scribe coats, and translucent materials that will accept pen and ink drawings. This new product replaces a coated glass cloth at lower cost, and provides a fiber-free smooth and dimensionally stable drawing surface.

Metallized Polyester Films

One of the things that has brought to polyester film such wide public attention is its affinity for metallization. This, coupled with printability and the fact that the problems of

Courtesy Keuffel & Esser Co.

Polyester film processed to accept drawings, scribings, or light-sensitive solutions can be used for making maps or other layouts requiring precision and performance

Courtesy E. I. du Pont de Nemours & Co., Inc.

Polyester film magnetic recording belt for dictation machine resists abrasion, moisture, heat, and cold

continuous lamination to paper, cloth, vinyl, metal, and many other bases have been overcome, leads the film into markets open to no other material.

There are several methods whereby colored gold, silver, and bronze laminates may be made:

1. Metallize polyester film (one side) and laminate (metal side down) to a suitable backing material.

2. Print colored lacquer on one side and metallize over the lacquer, then laminate (lacquer-metallized side down) to backing material.

3. Metallize polyester film (one side); print colored design on opposite side, laminate layer of plain Mylar over printed design. Combine with suitable backing material—metal side down.

4. Metallize dyed polyester film and laminate metal side down to a suitable backing material.

5. Metallize polyester film (one side). Coat pigmented adhesive on opposite side; laminate layer of plain polyester film to coated side of metallized material); and this (metal side down) to backing material.

There is a lot of argument in the field about the relative qualities of products produced by these different means. The fact is that, provided quality work is done throughout and that adhesion is good, all methods have merit. But for some applications—such as automobile trim—test demands are for 3 lb./in. of separation pull on a laminate, which is not easily obtained. For less stringent requirements there are plenty of metallized polyester film laminates on the market which test to ½ lb./in. of separation pull.

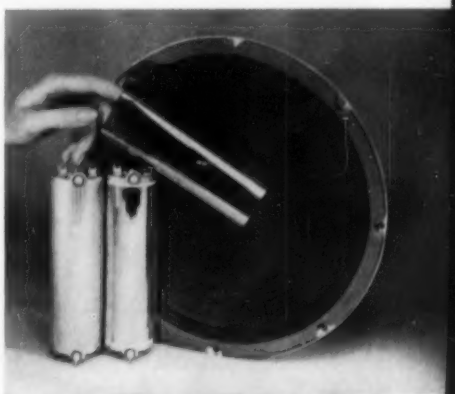
Accompanying this article (p. 88) will be found a list of companies that are presently engaged in metallizing Mylar film. Some of these do their own laminating; others have it done for them on a custom basis.

The applications of the various colored and metallized laminates are literally legion. They are going into places where abrasion resistance and cleanability is of importance. Panel inserts for automotive and airplane interiors, displays and signs, radio and television sets, home appliances, clocks, ladies' shoes and handbags, wallets, luggage, packaging, and even place mats are made more beautifully durable with these metallized film laminates. In addition, they can be slit into metallic thread for weaving and braiding. The matter of textile applications will be discussed later in this article.

On the 1956 model automobiles metallized Mylar is used in a number of ways and in a number of laminate forms. On one car the metallized polyester film, backed with a 10-mil butyrate film, is cemented to cardboard and sewn and stapled into position. On another it is laminated to non-migratory vinyl and electronically heat-sealed to an interior door, producing a chrome effect with great economy. On still another it is fabric-supported and sewn into position. It makes a washable and durable interior door trim, decorative padding and ornament for instrument panels, welting for upholstery, and even kick pads where its abrasion resistance is effective.

In the luggage and wallet field The Acme Laminating Co., Hazel Park, Mich., uses a 0.014-gage nonmigratory vinyl to which Coating Products, Englewood, N. J., laminates aluminized and colored Mylar embossed with various patterns. Acme Laminating takes this material and electronically heat-seals it to other vinyl materials to manufacture a finished wallet.

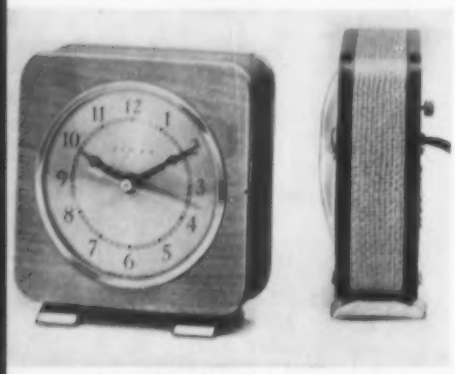
The United States Time Corp., Waterbury, Conn., obtains from



Courtesy E. I. du Pont de Nemours & Co., Inc.

Metallized film fitted over aluminum tube replaces conical speaker

Dorrie Process Co., Bklyn, N. Y., a colored, metallized, and embossed Mylar film laminated to vinyl-covered fabric by Hicks & Otis, Norwalk, Conn., and applies this to a wooden clock case to produce a product of great beauty. Juke-boxes made by J. S. Seeburg Co. have decorative components of metallized embossed Mylar from Coating Products. Laminated to leather, metallized Mylar produces a literally indestructible and easily washable product. Allied Kid Co., Philadelphia, Pa., uses this approach in the production of glamorous gold- and silver-surfaced fine leather for garments, shoes, etc.



Courtesy U. S. Time Corp.
Gold-metallized polyester film laminated to cloth decorates new clock

The areas of application of the metallized, colored, and embossed polyester film laminates are fantastic in scope. There is hardly an item of ladies' outer apparel that is not benefiting from this development in this current year of richness in dress accessories. There is hardly a decorative home furnishing item that cannot benefit from the beauty and durability of this development. With a projected passenger car production of over eight million cars in 1956, hundreds of acres of polyester film will be used. And we have not yet moved into specialized book bindings, wallpapers, and labeling.

A spectacular and functional use of metallized Mylar is found in the new electrostatic high-frequency speaker developed by Philco Corp., Philadelphia, Pa. This small cylindrical speaker designed for high-fidelity sound up to the 20,000-cycle range replaces larger, heavier, and more expensive units which frequently were not efficient over 10,000 cycles.

In old-style speakers where sound waves are initiated in the voice coil at the center of the paper cone, there can be distortion at high frequencies. In the new electrostatic speaker the sound originates on the ½-mil metallized film which is actually the vibrating electrode of the speaker. This fits over an aluminum tube which is a stationary electrode. In Philco's newest phonographs the metallized Mylar speaker is so beautiful that it becomes a decorative part.

Strength and attractiveness of polyester film (in this case, metallized and then embossed) combine to make decorative, non-tarnishing, and scuff-resistant book covers
Courtesy E. I. du Pont de Nemours & Co., Inc.

Textile Applications

As mentioned above, polyester film has made it possible to completely overcome previous problems with metallic fibers. There are two main sources of these metallic yarns, made by two different methods. One is the method used by The Dobeckmun Co., N. Y., to produce Lurex-MM (metallized Mylar). The Dobeckmun process revolves around a special vacuum-coating method on one side and laminated on one or both sides to prevent oxidation and give a balanced yarn. Its great advantage is that with its terrific strength it can be knitted, with its heat resistance it can be dyed at the boil, and it can never tarnish so may be used for washable outdoor fabrics. The color is applied to the metallic fibers by the use of colored adhesives or using dyed Mylar.

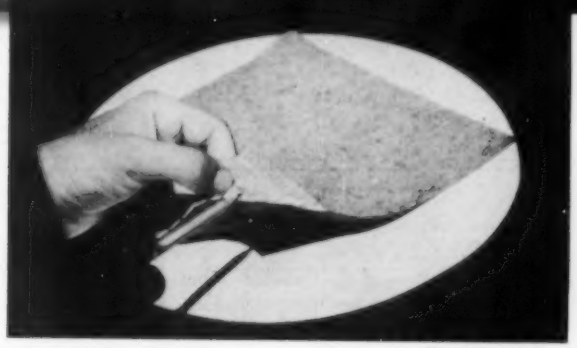
The other main source was developed by the Textile Dept. of Reynolds Metals Co., Richmond, Va., and involves the sandwiching by lamination of aluminum foil between two Mylar films with colorless or pigmented adhesive.

Of course, non-metallized clear or colored polyester film yarns are also on the market. The same dyes that color Dacron will also be used to color Mylar.

As pointed out above, polyester film can now be laminated to practically anything. The Felters Co., Boston, Mass., is applying the transparent film to fashion felt fabrics for use in women's raincoats, shoes, handbags, hats, as well as in the home furnishings field. In one case the company bonds to the felt a Lurex-MM gold thread made by The Dobeckmun Co. and then applies the Mylar film, producing a unique style product.

The Marvellum Co., Holyoke, Mass., is laminating polyester film to kraft, rag, and sulfite papers, both coated and uncoated, printed and embossed in fifty different patterns and in a great variety of colors with base stocks ranging from 5 to 50 mils in thickness. The company anticipates applications for luggage,

(*To page* 218)



Photos courtesy The Goodyear Tire & Rubber Co.

Upholstery material is made by electronically welding latex-bonded non-woven fabric (top), wadding (shown by pencil), and vinyl (bottom)

Retention of pattern of embossed vinyl sheet is improved by the use of non-woven backing, which also adds strength to vinyl sheet

Vinyl Sheet Gets New Backing

Latex-bonded non-woven fabrics make great strides as support for vinyl in automobile upholstery

USE of non-woven bonded fabrics as a backing for vinyl-coated automobile upholstery has been making quiet but impressive gains over the past year. Such fabric gives multi-directional strength at a reasonable price and, in addition to a backing, is also practical for use in plastic laminates, as a base for coatings, and as a replacement for felt.

One such material, known as Lantuck, has been used for years as a filler in high-pressure laminates. (See MODERN PLASTICS, May 1949, p. 70.) Produced with random fiber distribution from cotton or synthetic fibers, Lantuck provides equal strength in all directions within the plane of the fabric. The non-woven fabric provides a smooth surface and high gage-weight ratio for vinyl sheet. Stitch and tear strength also are improved, without interfering with vinyl sheet's soft, pliable hand. It also permits a desirable amount of stretch and recovery in the finished product.

Lantuck non-woven fabric is supplied by Wellington Sears Co., Inc., New York, N. Y., selling agent for West Point Mfg. Co., West Point, Ga., producer of the material. As the name "non-woven" implies, looms or conventional weaving equipment are not necessary for the production of Lantuck; the random textile fibers are bonded together by using a nitrile rubber latex, vinyl latex, and other materials. According to Goodyear Tire & Rubber Co., supplier of Chemigum nitrile rubber latex, the latex imparts maximum strength, flexibility, and resilience to the bonded fibers, and offers an affinity

(*To page* 226)

CALENDERING—

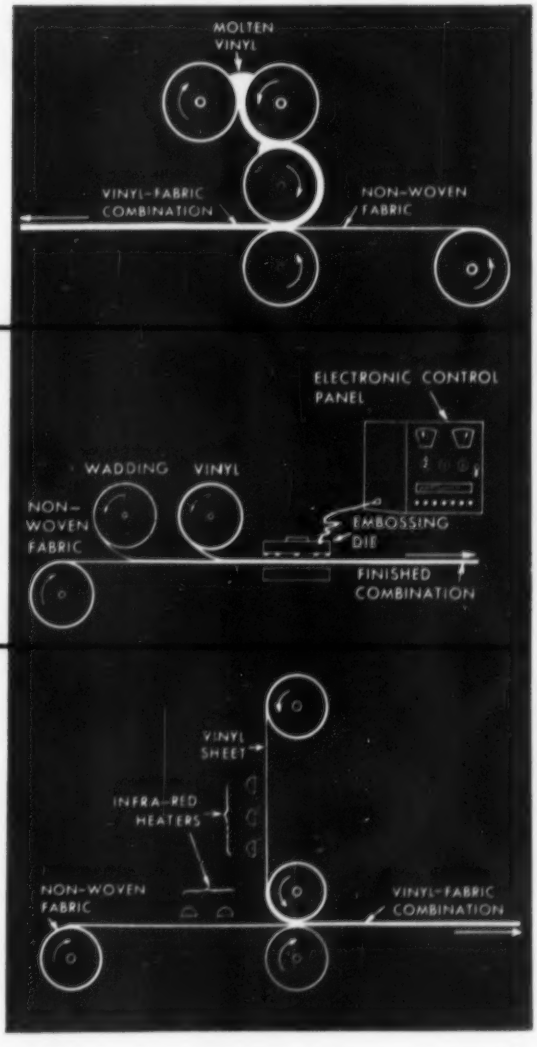
Vinyl, heated to molten state, is run through hot calender rolls and combined with fabric

QUILTING—

Preformed vinyl sheet, fibrous wadding, and non-woven fabric are fed into electronic welding machine and embossed with pattern

LAMINATING—

Non-woven fabric and preformed vinyl sheet are fed from two separate rolls through pressure rolls to make the finished backed sheet



Heavy-duty molded polystyrene utility container, which may be used to package small fishing tackle parts, hardware, etc., readily supports weight of man

How and Why More Kinds of Consumer Products Sell Better When

Packaged in Molded

Courtesy Monsanto Chemical Co.

Re-use value of polystyrene containers in which cottage cheese, salads, etc., are packaged, appeals to homemaker

Courtesy Premium Plastics Co., Inc.

Packing ice cream in transparent polystyrene containers—which enables the purchaser to see the actual product before she buys—has been credited with increasing ice cream sales by 200 to 400% at some retail stores

Polystyrene

NOW firmly entrenched as the "workhorse" plastic of the packaging field, polystyrene has climbed, in 10 short years, to an enviable position among the top-volume plastics materials. Versatile in application, available in crystal-clear or brilliant colors, and easy to mold on fast production schedules, it has become a potent merchandising factor in packaging a steadily increasing range of products.

Whether today's manufacturer is producing cottage cheese, nuts and bolts, phonograph needles, bobby pins, toys, novelties, jewelry, or small appliances, he cannot afford to overlook the possible advantages of a well-designed, soundly constructed polystyrene package. In this extremely competitive age he has come to realize that consumer preferences are often not only based on product quality but also on eye appeal of the product package.

While all the styrene plastics—polymers, copolymers, and alloys—are used in packaging, by far the greatest share of the market has been captured by molded polystyrene. It is with this specific material that the present survey of packaging applications will be concerned.

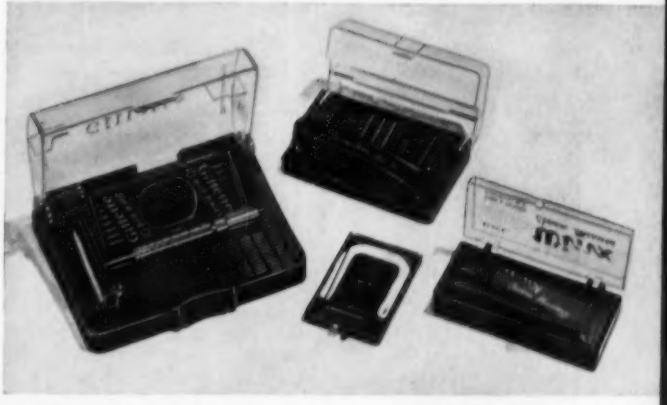
Approximately 13% of all polystyrene used in 1954 went into packaging; the corresponding figure was only 9% in 1953. Within the next few years, such uses are expected to increase by as much as 50 percent. Important to this projected growth is the *disposable* plastic package concept, which received major impetus with the adoption of dispenser-type razor blade packages and is now spreading to other types of polystyrene packages.

Merchandising Technique Changes

Fundamental changes in merchandising techniques, paced by food supermarkets but now spreading rapidly to many other types of retail trade, have also helped to boost the popularity of molded polystyrene packages. Yesterday's showcases, in which products were stored out of reach of prospective buyers, are rapidly giving way to open displays, self-service, and—in many instances—to individual product packages which serve as their own showcase. Under this type of selling, the package must not only adequately protect

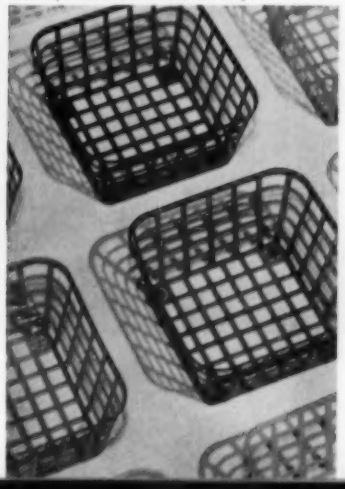
Courtesy Coats & Clark, Inc.

Transparent cylindrical box for zippers lets customer see size, color, and type; provides greater stock control; boosts sales

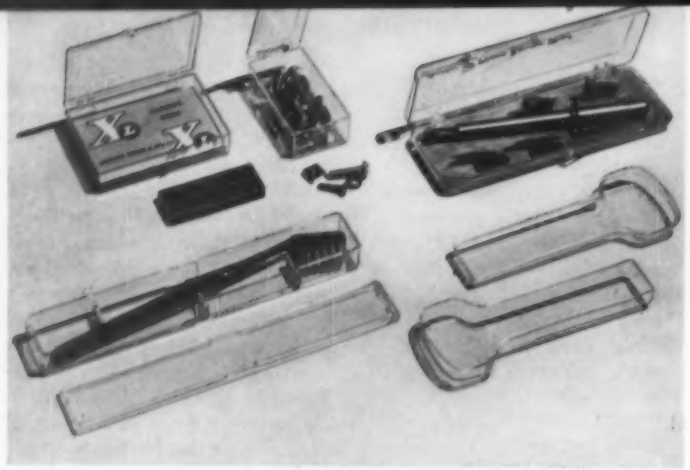


Variety of articles can be effectively packed in hinged styrene boxes: safety razors, staplers, mascara kits, cigarette lighters

Courtesy Massachusetts Plastics Corp.



Molded styrene baskets are increasingly replacing paper or wooden containers for berry packages



Whether it's a toothbrush or a tool, product visibility means sales appeal—stock molded (top) and specially designed styrene boxes (bottom) provide that visibility

the product, but must also draw favorable attention and help complete the sale.

Clear or Colored

Crystal clarity, affording maximum visibility to the packaged product, is certainly one factor behind the rapid rise of molded polystyrene in the packaging field. Also important is the fact that containers may be molded in virtually any desired opaque or translucent color, as well as in pearlescent effects, metallic tones, or with dispersed metal particles for unusual display appeal. For many products, the combination of a colored base with a clear transparent

Hairbrush is sold in polystyrene box which becomes permanent container after purchase

Polystyrene cigar box not only has sales appeal, but doubles as handy humidor

Vitamin tablets are given eye appeal as well as product protection by molded polystyrene container

Courtesy The Upjohn Co.

Transparent polystyrene container with hinged lid and snap catch is ideal for packaging pharmaceutical items

cover affords the most desirable balance between product visibility and sales-stimulating color in the package itself.

The position of polystyrene as the most economical of the thermoplastic molding materials has, of course, been an important factor in the climb to workhorse status. Injection molders are familiar with polystyrene, work with it constantly, and have the necessary equipment to turn out custom designed containers for specific packaging jobs. In addition, as will be pointed out more fully later, literally hundreds of molded polystyrene packages are available as stock items, ready for immediate delivery, requiring no initial mold investment by the user.

The light weight of molded polystyrene packages is frequently reflected in important shipping economies. For example, molded polystyrene vials, jars, and other containers can weigh as little as one-fourth the weight of comparable glass containers.

Inert to Foods

Packages molded of polystyrene can be used in direct contact with food products. The material is completely inert and cannot impart taste or odor to foods. Also important, particularly in connection with food products, is the fact that styrene packages are not affected by exposure to moisture, such as might be encountered in a self-service cabinet for ice cream, cottage cheese, ready-prepared salads or desserts, and various other types of food products. Even if the housewife is delayed on her way home from the store, she has nothing to fear if the ice cream she purchased is sold in a tightly sealed polystyrene container. Although the product may eventually melt, it cannot soak through the package and spoil the rest of her food purchases.

This point also illustrates the wide temperature range under which polystyrene packages may be used. Such packages are not harmed by exposure to temperatures as high as 160° F. and may also be used in the sub-zero range without ill effects. For this reason, molded polystyrene containers are widely used for the home storage of frozen foods. Among the most popular containers of this type is the Freez-Tainer, a product of the Crown Cork & Seal Co. These containers, which are molded of crystal clear transparent polystyrene, make use of flexible molded polyethylene lids which provide an airtight seal. An interesting feature of the Freez-Tainer is the use of a "frosted" section on the side of the package on which the name of the product, date stored, and other data may be written with a pencil, then erased when necessary. This marking area is produced by sand-blasting a portion of the mold cavity.

Dimensionally Stable

The remarkable dimensional stability of molded polystyrene, even in thin sections, has been another major factor in the climb of this material to a dominant position in packaging. Thanks to this property, polystyrene packages fit together properly and do not later warp out of shape. Hinged boxes close securely and catches, if properly designed and engineered, can be counted upon to hold. This factor is of great importance for the many molded polystyrene containers incorporating hinges which are force-fitted together, eliminating the need for a metal hinge pin and paring assembly costs to a minimum.

As in other types of molded plastics containers, polystyrene packages offer a wide choice of design treatments. They may be as utilitarian or as elaborate as the product to be packaged and its merchandising program require, ranging from simple round or rectangular boxes with friction-fit lids to elaborate cloth-lined boxes for bracelets, wristwatches, and other jewelry items.

Thanks to the versatility of the injection molding process, such containers may also be made with specially designed form-fitting cavities, lugs, and other features which hold the product securely in place. Covers or lids may be molded with integral lettering, instructions, designs, or other details, insuring permanent product and manufacturer identification. If not molded in, such data may be applied to the package by hot stamping, printing, or through the use of quickly applied decalcomanias.

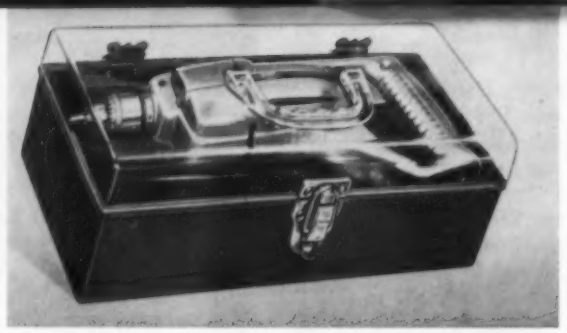
High Strength

Despite their light weight, rigid molded polystyrene packages have relatively high strength. When extreme sturdiness is required, it may be obtained through the use of in-

Polystyrene dispenser package has lid with molded-in teeth to cut off tape

Molded styrene box for physician's medical kit includes hinged inner tray

Box for wood bits has supporting lugs molded into cover lid



Drill set is packaged in styrene case of red base and transparent cover. Hinges and locking catch are riveted to case

Lock and key set is effectively merchandised by placement in die cut insert angled in molded polystyrene box

creased wall sections, incorporation of reinforcing ribs when necessary, and careful attention to such details as hinges, catches, etc., where breakage might be most likely to occur.

One excellent example of sturdiness in a polystyrene container is a heavy-duty compartmented box molded by Mercury Plastic Co., Van Dyke, Mich. This clear transparent container, incorporating a hinged lid with metal hinge pins for added strength, measures 6½ by 10½ by 1¾ in. and has 18 molded-in compartments. Ribs forming the compartments are amply filleted and the wall sections of the container approximate ⅛ inch. This box, which has been successfully used for selling assortments of nuts, bolts, and related items, weighs slightly more than 1 lb. and is sufficiently strong to bear the weight of a man without damage.

Re-Use is Important

As the previously mentioned trend toward disposable polystyrene packages continues, such packages will consume an increasingly large volume of the plastic material. However, up to the present time, by far the largest proportion of molded polystyrene packages used have been those having definite re-use value. For many products, of course—drill sets, electric shavers, pen and pencil sets, etc.—the molded container is used for permanent storage.

It is difficult to over-estimate the added sales appeal which may be given to a product by an attractive container having obvious re-use value. Such a package, in the mind of the consumer, is accepted as a "plus" value of the product itself—something which gives the basic item added sales appeal and desirability. One major supplier of stock molded plastic packages has pointed out that through the use of a well chosen container, the product supplier can provide the consumer with a reusable container at approximately half the retail cost of a comparable container alone.

Success Stories in Foods

Many of the most noteworthy sales success stories involving molded polystyrene packages have to do with food products—ice cream, cottage cheese, prepared salads, gelatin desserts, and numerous other foods found in today's supermarkets. At the present time, many major suppliers of ice cream and sherbets are making use of molded transparent polystyrene containers in half-pint, pint, quart, and half-gallon capacities, for all or part of their production. Such containers have been credited with some remarkable sales increases.

One of the outstanding sales programs which have helped to establish the merchandising appeal of transparent molded containers was that conducted by the Golden State Co., Ltd., California's leading dairy foods manufacturer. This firm pioneered the use of the pint-capacity I-C Pak container on a full distribution basis, following an initial test campaign which suggested the powerful sales appeal of the Styron package.

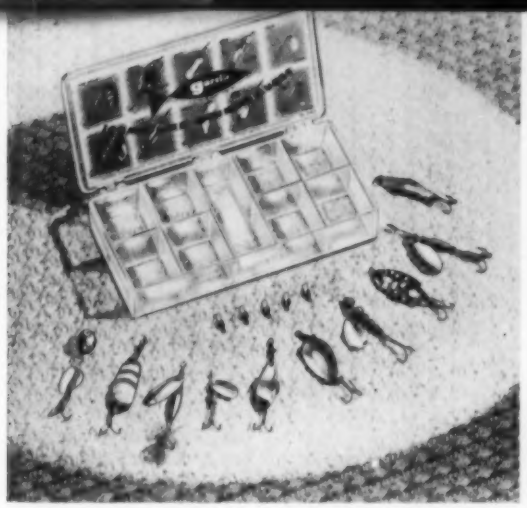
In this program, 16 stores were selected in the Los Angeles area and all the company's Cream O' Gold ice cream in paper containers was removed from the cabinets. Cabinets were then stocked with I-C Paks. No special advertising was done; the entire selling job was left to the attractiveness of the display itself, with the various flavors plainly visible through the transparent containers and lids. Even with an increase of 5¢ per pint retail to defray the increased cost of the plastic package, sales in all test stores increased from 200 to 400%, with one recording an *800% increase* during the one-month test period. The success of this test resulted in adoption of the I-C Pak as a permanent Cream O' Gold package.

"Impulse" Sales Boost

Marketing studies place ice cream among the top ten "impulse" items of the 62 major food products sold in retail outlets. Actually, according to one source, only 9.1% of shoppers intend to buy ice cream when they enter the store, while nearly 60% purchase the product solely on impulse. This being the case, any package which can help to stimulate impulse sales of ice cream while affording the desired product protection is naturally of great interest to the dairy products field.

Many other food products also take on added sales appeal when displayed in transparent polystyrene containers. Among them are candies, cottage cheese, cole slaw, potato salad, and various gelatin desserts. One point many of these products have in common is the fact that they are ready-prepared and can be placed on the dinner table with little or no preparation. The transparent container not only enables the housewife to make a visual check on their quality, but also reminds her how she

(*To page* 228)



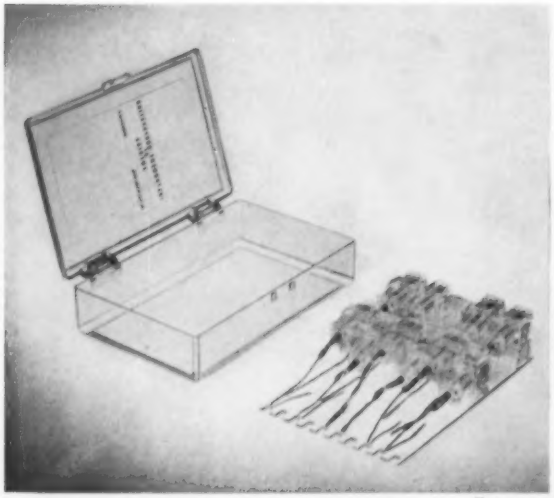
Ten spinning lures come packed in compartmented styrene container. Printed sheets on inside of hinged cover identify each

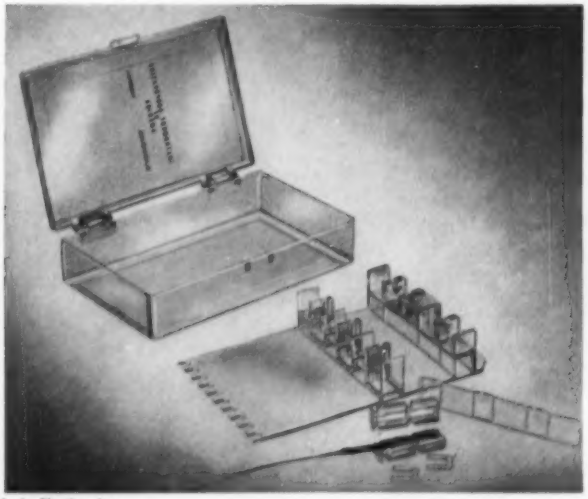
Twist-Free Pak for spinning line (foreground) consists of molded styrene box with hole through cover; is merchandised on revolving display

Two-piece styrene packages for charms and novelties facilitate automatic vending of these non-uniform, hard-to-handle items

Courtesy Monsanto Chemical Co.

Sewing box holds 14 spools and incorporates molded-in cutting blade to sever threads





Photos courtesy Lurie Plastics, Inc.

Precision-made miniature slip rings are packaged in stock molded polystyrene box with molded base insert of intricate design (see photo at right). Each ring is enclosed in individual two-piece cover. Rings come packed twelve to each container

Rugged

Courtesy Kawneer Co.

Door of honeycomb construction has vinyl-aluminum laminate outer skin that gives it integral color and texture. Model displays laminate samples in complete range of colors

BY TEAMING plastics, metal, hardboard, and paper, the Kawneer Co., Niles, Mich., has given the institutional door a new, high-fashion look. That company is producing a lightweight flush door with a colorful vinyl plastic skin that is rugged enough to take any of the abuse given doors in schools, offices, and public buildings—despite its attractive and apparently delicate appearance.

The vinyl skin gives the door permanent color and also a textured finish that is new to functional doors. Seven colors are being used with either a linen or leather-like finish. The vinyl, of course, is rustproof, easy to clean, and difficult to scuff or stain.

Vinyl-Metal Laminate

The first step in constructing the new doors is laminating the sheet vinyl to the 0.025-in. aluminum outer skins. This job is done for Kawneer by Clad-Rex Steel Co., Denver, Colo., using the Marvibond process. (See MODERN PLASTICS, June 1955, p. 107.) In this process, sheets of vinyl are bonded to metal coil or sheet stock on a continuous basis, using an adhesive and moderate rolling pressures.

The vinyl-coated aluminum is then used by Kawneer as the outside layers of a sandwich-type assembly. First step in building this sandwich is to place a vinyl-coated aluminum sheet face down on a protective caul sheet. The reverse side of the metal is then sprayed with a phenol-resorcinol-formaldehyde adhesive and placed on the aluminum sheet. On top of this is placed a rigid honeycomb of resin-impregnated paper that has also been sprayed with the same adhesive. The cell width of this honeycomb is ¾ inch. Another layer of 0.1-in. adhesive-coated hardboard, another vinyl-coated aluminum sheet, and a final top caul sheet complete the assembly of the honeycomb structures.

Extruded aluminum rails are then fitted around the assembly. The rails have a cross-section that permits locking the vinyl-coated aluminum sheets in place. These rails are dou-

Workman takes from rack vinyl-aluminum laminate to be used in production of lightweight door for public buildings. The laminate will become outside layer of sandwich-type door

Courtesy U. S. Rubber Co.

Doors are made by combining phenolic-paper honeycomb, hardboard, and vinyl-aluminum skins with a resorcinol adhesive

ble-lapped at the top edge of the door to increase moisture resistance and are sealed with mastic.

Hot Platen Press

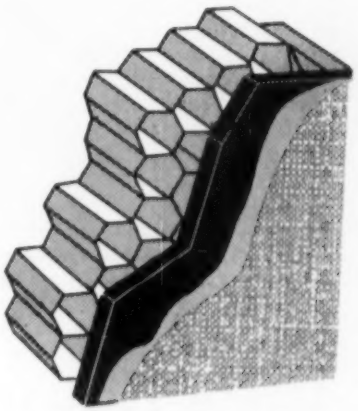
The entire assembly is then put in a hot platen press and bonded into a single unit. The result is a rugged, lightweight, attractive door blank. While its aluminum outer skin is relatively thin, the hardboard backing will absorb, and distribute evenly, any blows or knocks.

Finishing steps on the door include installing the hardware and any glazing effects desired. The lock area is cut out and the lock mechanism inserted. A block of Styrofoam is inserted around the lock to prevent moisture from getting into the door. Cut-outs are also made for glass, or louvered panel inserts. Mitered metal frames, with no exposed screws, are used in installing glass and louvers. A finishing step is the drilling of tiny weep holes in the door's bottom edge to equalize interior and exterior pressure and also as a drainage for condensate.

Kawneer finds this new construction method fast and efficient. It likes the use of vinyl-coated aluminum stock, explaining that it gives pattern, texture, and color effect. It also speeds production because no additional finishing operation is needed on the door surface after it comes from the press.

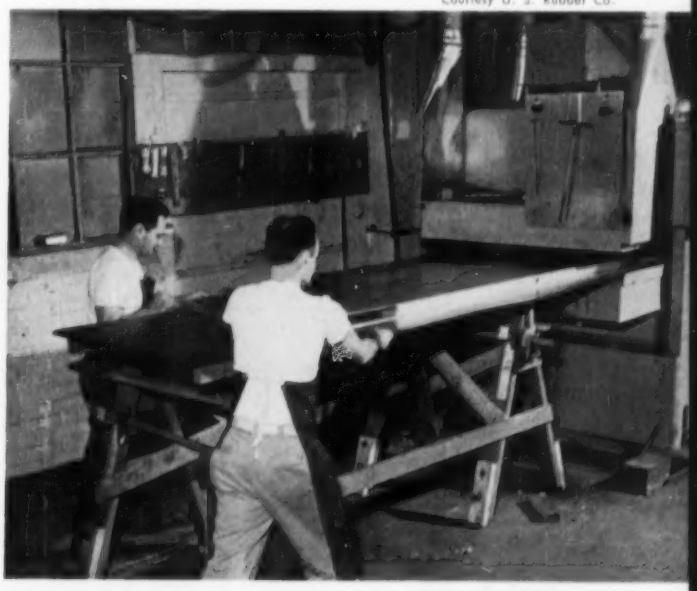
The colors and finishes used in the new doors are tile red and sage green in a colonial finish; a linen texture finish in jonquil yellow, flame red, salt and pepper grey, and olive green, and a leather-like finish in luggage tan.

According to Kawneer, the new door has ten times the strength of girder-construction doors. This strength, combined with the lightness of the door and its attractive appearance, gives it a definite position of prestige in the functional door field.



Cut-away diagram of door, showing (l. to r.) honeycomb core, hardboard, aluminum sheet, and vinyl skin

Courtesy U. S. Rubber Co.



The complete honeycomb-sandwich door assembly is placed into a hot platen press where it is bonded into a single unit

Courtesy U. S. Rubber Co.

Vinyl-clad aluminum sheet is placed on top of phenolic-impregnated honeycomb core. Hardboard backing below laminate absorbs shock

Photos courtesy G-M Laboratories, Inc.

Rugged housing for exposure meter (front view, left; rear view, right) is molded of grey urea in two parts—base and cover—that are joined together with screws

One-piece polyethylene carrying case for meter has molded-in latch which locks cover securely in place

Urea Housing, Polyethylene Case

Enhanced sales appeal and more efficient performance result from extensive use of plastics materials in new exposure meter

Exposure meter is packaged in hinged, transparent styrene gift box

FUNCTIONING as a coordinated team, three types of plastics—urea, styrene and polyethylene—contribute to the operating efficiency, user convenience, and sales appeal of the new Skan Quick exposure meter, a product of G-M Laboratories, Inc., Chicago, Ill. Chosen in each instance for their specialized properties, they demonstrate how plastics can meet a broad variety of end-use requirements.

Urea Housing

The housing of the meter itself is molded of grey urea. As used in this application, urea provides a combination of attractive color, a hard, wear-resistant surface, and the high degree of dimensional stability necessary for precision instruments of this type. The unit is sold in a specially designed clear transparent styrene gift box of hinged construction, whose tight-fitting catch prevents the package from springing open and allowing the meter to fall out. Within the box, the instrument rests on a die-cut flocked paperboard platform which holds it securely in place. Offered as an accessory to the meter is a form-fitting Ever-Ready carrying case molded of polyethylene in a matching grey color. This indestructible one-piece case enables the user to carry and operate the meter conveniently without fear of damage.

The two parts of the urea meter housing—base and cover—are produced in separate molds on Stokes automatic compression presses. Following the molding operation, several of the cored openings in these parts are tapped to accept assembly screws. No molded-in inserts are involved. The inner surfaces of these parts are designed with bosses which facilitate location and secure mounting of the magnet and other parts of the meter movement.

As part of the assembly process, the etched aluminum front name plate is tapped in position, as well as another metal part which includes the cord loop slot. The metal computer dial on the back of the meter

(*To page* 245)

FROM DESIGN TO 3D DISPLAY

Sheet formed displays are getting better—thanks to meticulous design and sound engineering

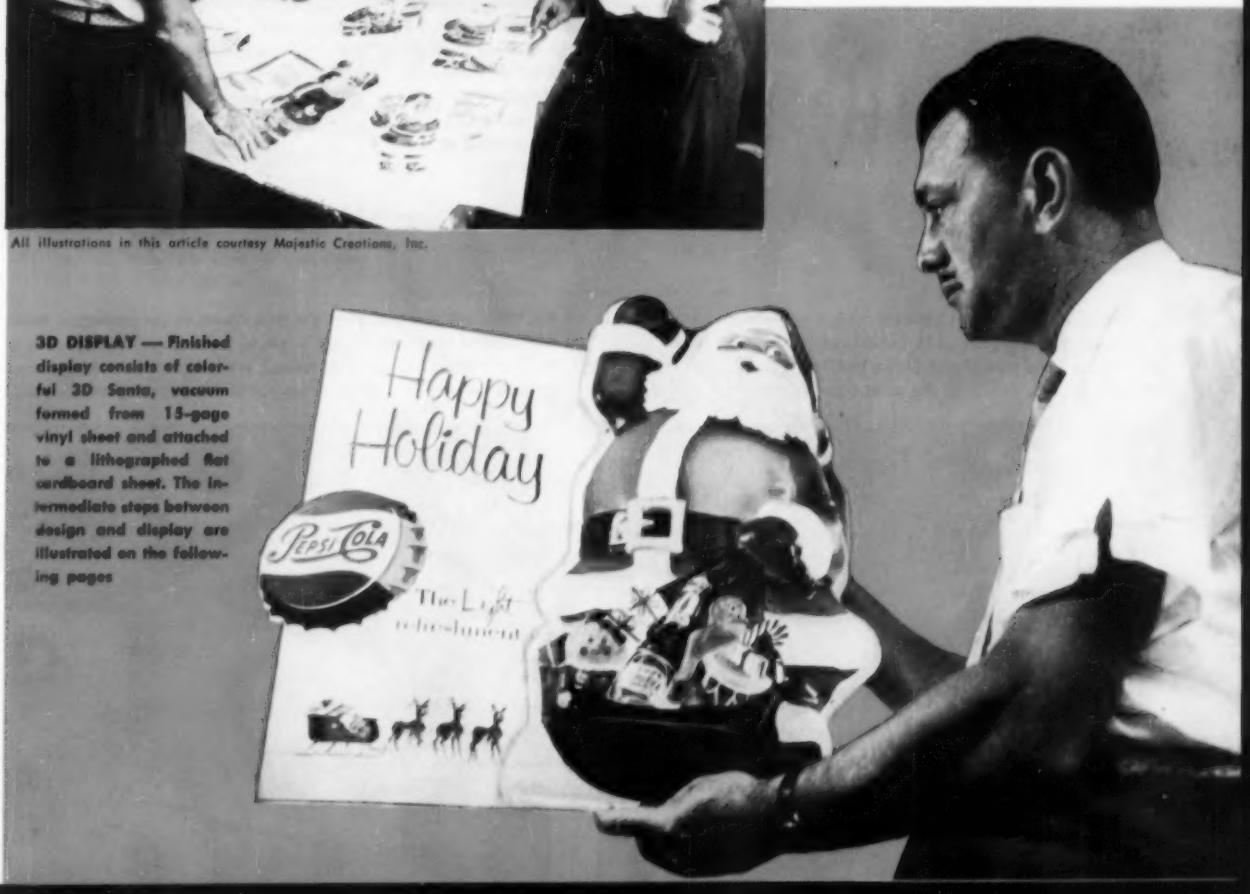
THE foundation on which sheet formed plastics products are building their future appeal to consumers and industrial users continues to take on more and more substance with the introduction of each new formed application. In the sign and display field, in particular, this year's crop of formed sheet products, while certainly bigger, more colorful, and more spectacular than ever before, must also be rated as better engineered and more soundly designed.

As the photographs accompanying this article illustrate, translating design into a finished three-dimensional display calls for a high degree of coordination between the design and production departments. The case in point—a vacuum formed counter and window card display for specific use in Christmas-time merchandising; the fabricator—Majestic Creations, Inc., Woodside, N. Y., a leading display house specializing in vacuum forming; the customer—Pepsi-Cola Co.

The original decision to go to

DESIGN—Initial full-color sketches for proposed vacuum formed three-dimensional Christmas display are studied by production and design heads of Majestic Creations before being sent out for client's OK

All illustrations in this article courtesy Majestic Creations, Inc.



3D DISPLAY — Finished display consists of colorful 3D Santa, vacuum formed from 15-gage vinyl sheet and attached to a lithographed flat cardboard sheet. The intermediate steps between design and display are illustrated on the following pages

Fig. 1—As the first step in the production of the 3D Santa Claus figure, a sculptor, working from the original sketch, prepares a clay model of the figure in the half-round. Care is taken to produce the model without undercuts, which would complicate forming

Fig. 2—From the full-size clay model, a plaster mold is cast. Vacuum holes are then drilled into the mold (right) to prepare it for forming operations. The plaster mold can be economically used to draw sample models which serve as guides for any refinements to be made in design

Fig. 3—Sample figures vacuum formed on the plaster working mold are hand-colored by an artist and are used in the assembly of the full-size comprehensive sent out to the client for final OK. The hand-colored model will also be used as a guide in arriving at the preprinted distortion pattern

vacuum forming for the creation of a Christmas-time display was made by the Pepsi-Cola Co. for much the same reasons that have catapulted the forming technique into such prominence throughout the entire sign and display field: the wide design latitude possible; the visual impact of the three-dimensional effect; the speed and economy of tooling up for the job; the light weight and toughness of the formed plastic sheet materials; and the economies inherent in decoration by the preprinting technique.

Design for Forming

On this particular job the combined decision of the Pepsi-Cola Co. and Majestic Creations was to produce a display consisting of a vacuum formed Santa Claus figure attached with paper fasteners to a lithographed flat cardboard sheet. Such a construction, it was felt, would enable the display to be knocked down and nested together for easier and more economical shipment. In addition, the retailer can remove the formed Santa Claus figure after the display has served its purpose and use it in his own home as a Christmas decoration—a good-will feature for Pepsi-Cola.

With this as a starting point, Majestic Creations tackled the job of economically translating the idea into a colorful, dramatic display. At the initial conference of Majestic's art and production staffs, several basic decisions were made on the techniques to be followed.

Because the Santa Claus figure would be preprinted in distortion in the flat and then formed in register, it was decided to use 15-

Fig. 4—When final OK has been received, a three-cavity water-cooled male production mold is cast in aluminum alloy from the female plaster working mold and placed in the bed of a 42- by 72-in. vacuum forming machine. Height of the mold is approximately 4 inches

Fig. 5—Blank sheets of vinyl are then drawn on the production molds to determine temperatures and length of forming and cooling cycles to be used. When a perfectly formed piece has been achieved and checked for accuracy, areas to appear in color are outlined in pencil

Fig. 6—Formed sheet with pencil outline is then flattened out by applying heat. Penciled-in areas now serve as a guide for the silk screener who applies the color in distortion. Separate patterns are made for each of the three figures

Fig. 7—Close-up of operator cutting silk screen stencils. Accuracy usually demands making at least two stencils for each color. The distortion patterns made with both the initial stencil and the corrected stencil are checked for registration by forming

gage vinyl sheet for the job. According to Majestic, vinyl sheet shows the most consistent results in forming to close register in display work. In addition, since some of the displays were intended to be illuminated, a translucent material was selected.

Another basic decision was to use the low-cost and easily adaptable silk screening process for arriving at the distortion pattern. Since the expected run on the formed display, however, was approximately 25,000 units, it was decided to do the actual printing by lithography. According to Majestic unless a particular type of art effect is specified, silk screening is used for runs of 5000 or less and lithography for runs of over 5000.

The length of the run was also taken into consideration in the selection of a water-cooled cast aluminum alloy mold for the forming operation and in the final decision to run the formed pieces three-up on one of the larger vacuum forming machines with a bed measuring 42 by 72 inches.

Having set the basic pattern for the production run, the job was then handed over to Majestic's art department where initial sketches were drawn up for Pepsi-Cola's OK. The explanation of the step-by-step operations that led from this point to the finished 3D display, as it was readied for shipment to retailers and distributors all over the country, accompany the production photographs which appear on these two facing pages.

CREDITS: Vinyl sheet supplied by Nixon Nitration Works, Nixon, N. J.; mold by Victory Mold & Die Co., New York, N. Y.

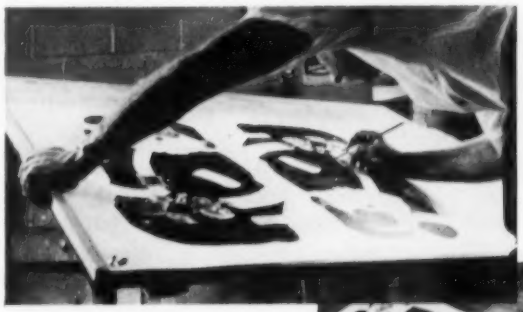


Fig. 8—When the silk screened distortion pattern has finally been accepted, it is touched up by an artist and is used in making the 5-color lithography plates on which the job will be printed

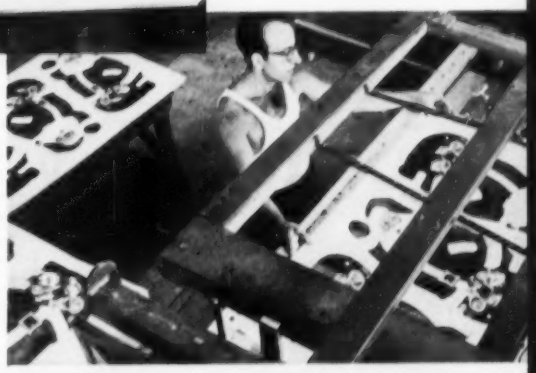


Fig. 9—The flat vinyl sheet, printed in distortion, is then placed over the male molds (right), it is clamped into position, and the vacuum forming machine is set into motion. Heating cycle for the job is 17 sec.; cooling cycle is 20 seconds

Fig. 10—To assist removal of the formed sheet from the mold, cold air is blown over the top of the sheet. Colors on the formed pieces now register accurately in position

Fig. 11—After being taken out of the vacuum forming machine, the three Santa Claus figures are separated by band saws and die cut on a clicker press (right) one at a time. The display is now ready for final assembly into the finished product

Courtesy Kroehler Mfg. Co.

Modern, graceful styling, which would be difficult and costly to achieve with all-wood construction, is economically accomplished in the design of new sofa by using rugged contour molded polyester-fibrous glass laminate for the basic shell of the piece

Furniture With a Future

Reinforced plastics frames are combined with foams and vinyl sheeting to produce a completely new concept in upholstered pieces

WILL the huge field of upholstered furniture be the next major market developed for molded reinforced plastics? A new program now under way by one of the nation's largest suppliers of upholstered furniture points to some interesting possibilities.

Completely new concepts of furniture design and construction, made possible by combining contour molded polyester-fibrous glass laminates with other materials conventionally used by the furniture industry, are embodied in two new pieces recently introduced to the market by Kroehler Mfg. Co. under the Valentine Seaver label. They are the XK-101 chair, which incorporates a one-piece molded reinforced plastics shell with a molded foam cushion shaped to fit the back; and the XK-100 sofa, utilizing reinforced plastic end bells, as well as reinforced plastic front rail and back.

New Design Approach

Although reinforced plastics have been used previously in the production of form-fitting chairs in a number of designs, the new Valentine Seaver XK-101 chair marks an entirely new approach in the effective combination of the basic structural shell, the cushioning medium, and the application of the upholstery fabric; the revolutionary XK-100 sofa is believed to also be the first of its kind.

Freedom and freshness of design were primary factors in Kroehler's decision to develop these two pieces. Through the skillful use of molded fibrous glass-polyester parts, it was possible to incorporate in them a flowing "sculptured" look which would be extremely difficult and costly to achieve in pieces limited to conventional wooden construction. In the sofa, the molded plastic back, front rail and ends, including the arm rests, are bolted together, forming a rigid, sturdy exterior which is virtually impossible to dent or damage in normal use. The current samples are covered with textured vinyl sheeting by a process developed by General American Transportation Corp., Plastics Div., Chicago, Ill., which company also molds and assembles the reinforced plastics parts.

Although they were projected originally as "conversation pieces" to sample market reaction and to survey possible new applications of plastic laminates in upholstered fur-

niture construction, the new Valentine Seaver sofa and chair proved so popular with buyers at furniture market showings that Kroehler executives decided to put both pieces in limited production. Both units will retail in the upper portion of the popular price range—the chair at approximately $150 and the sofa at about $400.

Vinyl Upholstery

The style treatment of the new sofa and chair are tastefully coordinated. For the present, the exterior of the sofa will be finished in eggshell-colored Boltaflex vinyl sheeting in a "Plamino" pattern simulating leather. The sofas wooden legs, available in a new pickled ebony finish, match those used on the chair.

The back of the chair is cushioned with a 3 in. thick molded rubber cushion, shaped to fit the human body. The balance of the inside surfaces of the chair, beneath the removable seat cushion, is also lined with rubber. The back surface and bottom of the chair shell are covered with vinyl sheeting.

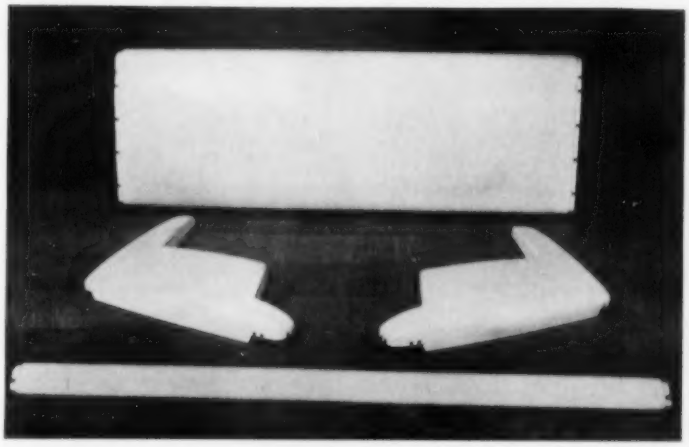
A unique feature of the XK-101 chair is the fact that the upholstery covers are removable, being made with an elastic border which fits securely over the basic plastic shell and is held in place by turned-under edges and arm rests of the shell—yet can be easily slipped off for cleaning. The removable fabric feature provides variety in room decoration, since covers may be changed if desired at different seasons of the year.

Preform Molding

Delivery of the two new Valentine Seaver units is scheduled to get under way late this year following completion of final tooling. Initially, the various reinforced plastic components for market samples were produced by a hand layup operation, using preliminary plaster molds. In the current production set-up the parts will be match-metal molded in large-platen presses.

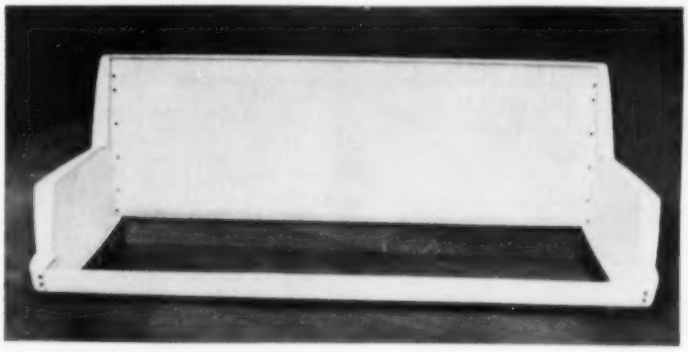
The one-piece chair shell and the end sections for the sofa will be molded from preforms produced in a preform machine equipped with automatic roving cutter. This type of operation, widely used in making large-area reinforced plastics parts, involves the use of a perforated mandrel rotating within a plenum

(*To page* 246)



Courtesy General American Transportation Corp.

Reinforced plastics components which form the basic shell of the sofa include: front rail, two end bells (center) contoured to form arm rests, and the sofa back



Courtesy General American Transportation Corp.

Prior to upholstering with vinyl sheeting, molded components are bolted together to form sturdy frame

Matching chair has one-piece reinforced plastics shell and foam cushion back; vinyl upholstery has elasticized border for easy installation

Courtesy Kroehler Mfg. Co.

Have You Looked At VINYL DISPERSIONS Lately?

As a low-cost protective coating for metal, the plastisols and organosols continue to merit top consideration by engineers, designers, and product finishers

SEEMINGLY overnight and from out of nowhere, vinyl dispersions have suddenly blossomed into a much talked-about and highly-touted entry to the competitive list of low-cost protective coatings for metal.

Actually, the vinyl dispersions—both organosols and plastisols—are not new as a coating for metal. But although they have been available to industry since 1943, it has only been in recent months that their impact has been felt to such an amazingly large degree in the realm of industrial finishes.

There have been any number of reasons advanced in explanation of this sudden revival of interest in the dispersions. For one thing, it has taken several years to develop the field test data on the material now being made available to industry. For another, the appearance of several large-volume consumer applications on the market has attracted considerable attention. But the lion's share of credit for the revival seems to belong to the strides made in recent months in improving formulations, in devising new methods of low-cost, easy application, and in exploiting new market areas, especially those involving mass-produced consumer products.

When such items as typewriters, automobiles, business machines, and dish washers, and other kitchen equipment are added to the established—and still growing—list of industrial applications as a market for vinyl dispersion coatings, sales can be expected to take a sharp swing upwards. One supplier of vinyl dispersion materials conservatively estimates that the current approximate $6 million market for dispersions (about 1% of the estimated $600 million market for industrial finishes of all types) may hit $7½ million by next year and $9 million by 1957.

If the present growth pattern which the industry is enjoying (e.g., another supplier reports 1955 sales at three times the volume of five years ago) continues, however, the market may turn out to be larger.

Plastisols and Organosols

The two over-all groupings into which the vinyl dispersion field is broken down are plastisols and organosols. The plastisols consist essentially of finely powdered vinyl resins dispersed in a plasticizer with appropriate stabilizers, pigments, and other modifiers added. In organosol formulations, the resin particles are more finely ground and are suspended in a plasticizer *plus* a volatile diluent.

As might be expected from this distinction in formulation, the plastisol and organosol coatings differ in several respects. Organosols, for example, are claimed to form a harder coating, but, because of the presence of volatile diluents, the thickness of coat that can be applied in a single application is limited (about 10 to 15 mils is tops). Plastisols, on the other hand, are claimed to form a more resilient, rubber-like coating when applied to a metal surface, have a glossier finish, and can be compounded to yield cured films as thick as ¼ in. in a single application. In addition, because of the greater film thickness possible, the resistance of

Courtesy United Chromium, Inc.

Appliance freezer baskets are coated with a specially formulated cold dip plastisol that protects the metal against abrasion and corrosion due to humidity, moisture, and foodstuffs

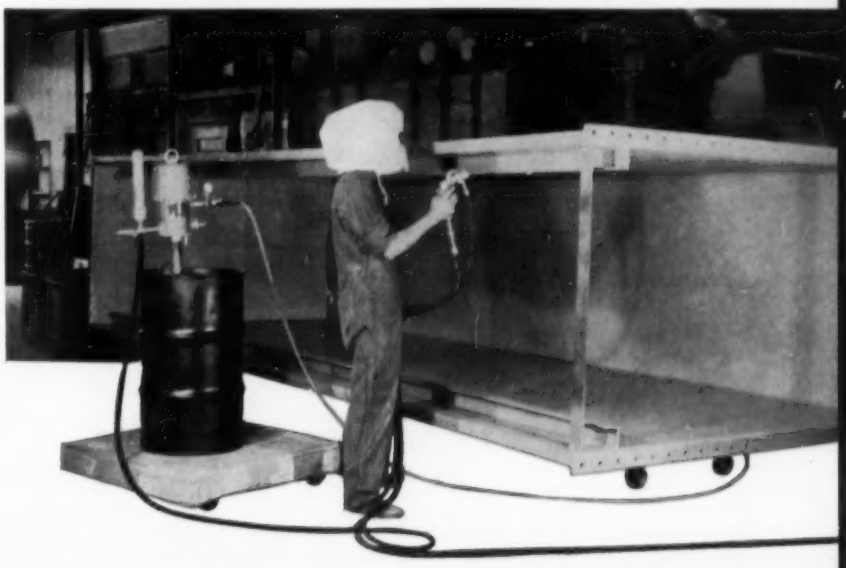
Photos this page courtesy United Chromium, Inc.

Objects that cannot be dipped (in this case, an 8 ft. long plating tank) are plastisol-coated with conventional spray guns

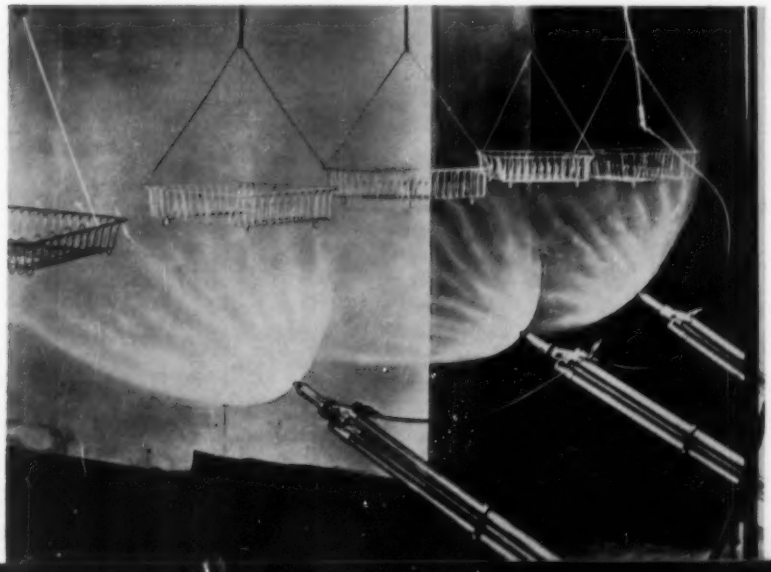
After spraying, the plating tank is rolled into an oven where the coating is cured at temperatures of 350 to 375° F. into a tough, continuous film

the plastisols to acids, alkalies, alcohols greases, and oils is, therefore, better.

The way the entire vinyl dispersion industry is currently shaping up, these differences have not thrown the organosols and plastisols into competition with each other, but rather have prompted them to seek out their own specialized markets. As one supplier described it, "the organosols right now seem to be concentrating on product finishes in that general market area that lies between the market for conventional vinyl solution coatings and that for the heavier plastisols; at the same time, the plastisols, while certainly in line for a good share of the consumer product business, are right now heaviest in industrial applications, especially those in which the



Where hard abuse is expected, spray-on plastisols can be formulated to yield cured films as thick as ⅛ in. in a single spray application



Electrostatic spraying equipment is used to apply plastisol to wire baskets. Ionized "mist" of plastisol deposits uniform coating over the entire surface

necessity for resistance to corrosion by chemicals or greases is an important requirement."

Advantages

As members of the vinyl dispersion family, however, both the plastisols and organosols have many advantages in common—primarily toughness, abrasion-resistance, corrosion-resistance, and ease of application—that makes them far superior to many of the conventional types of coatings.

Plastisol and organosol formulations are suspensions, rather than solutions, and, as such, overcome two of the basic disadvantages of thermoplastic resin solutions: 1) the low solids content which makes the build-up of a moderately thick film a time-consuming operation; and 2) the necessity for using expensive solvents which are lost on application. In contrast, the vinyl particles in dispersion materials maintain their identity while suspended in the plasticizer and, when baked at temperatures of 350 to 375° F., fuse into a tough, continuous film.

The organosols, which are generally applied to the metal surface by spraying, are normally applied at a minimum of 60% solids at the gun (most thermoplastic resin solutions are usually sprayed on at about 20% solids) to form a finish that on a mil for mil basis will outwear conventional baked enamels by a wide margin.

In plastisol formulations, the solvents have been completely eliminated making the material virtually 100% solids. The wide range of flow properties inherent in such formulations, especially the ability to be compounded to display a marked resistance to sagging, has permitted the use of a variety of application techniques. As coatings for metal, after a prime coat has been laid on the metal surface to assure permanent adhesion, the plastisols can be applied by several types of dipping or spraying methods. Included among these are:

Hot dip coating, in which the part to be coated is heated to baking temperatures before being dipped in the plastisol and then baked in an oven (the thickness of the film formed is determined by the amount of heat in the metal).

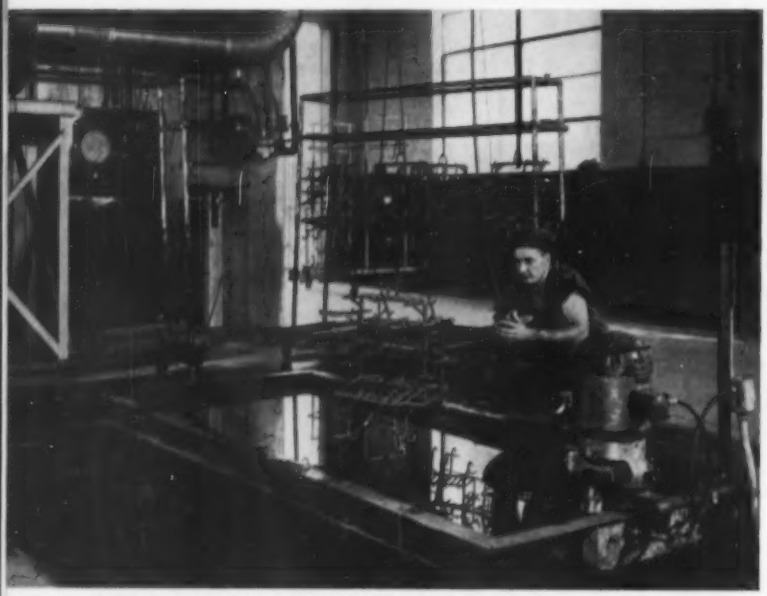
Cold dip coating methods which enable the plastisol to be applied to parts at room temperature and then cured by baking (the build-up is achieved in formulation without the necessity of preheating the part).

Spray coating, in which plastisols thinned with volatile diluents are applied with conventional spray equipment.

And electrostatic spraying, a new low-waste, rapid technique, recently announced jointly by United Chromium, New York, N. Y., and Scientific Electric, Garfield, N. J., in which ionic high potential equipment is used to spray an ionic "mist" around the object to be coated.

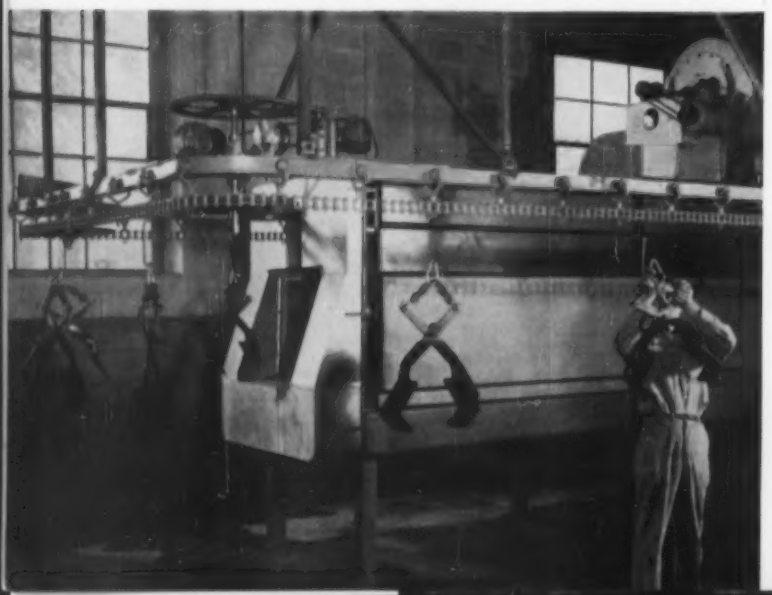
The choice between spray or dip application of the plastisol coating is generally governed by the size or shape of the metal object and whether complete or partial coverage is desired. In either case, however, plastisol-coated objects can be cured to stable form in from 20 to 30 min.—and the speed with which the individual objects can be coated is continually being increased. United Chromium, Inc., for example, also recently announced a new cold dip formulation which would allow an increase in dipping speeds from the normal 6 to 7 in. per min. up to 17

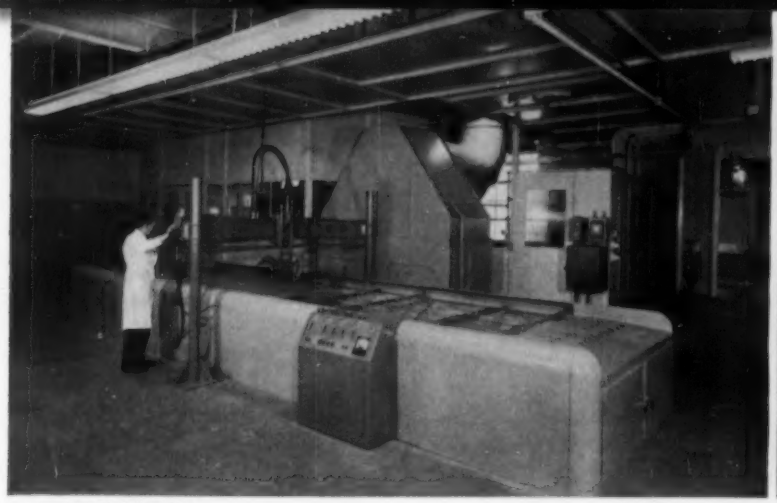
Metal fixtures, preheated to baking temperatures, are "hot dipped" into plastisol bath. Thickness of film is determined by degree to which parts are heated



Photos courtesy Michigan Chrome and Chemical Co.

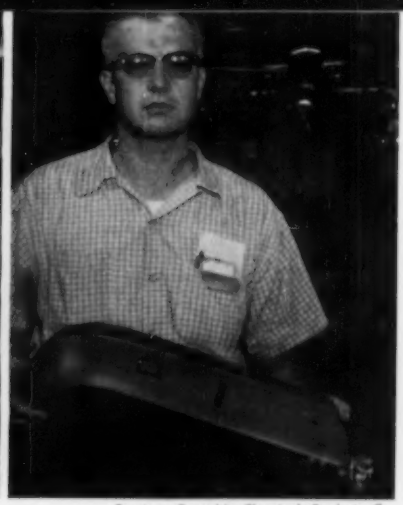
After immersion, wire goods, baskets, and similar small parts are cured in conveyor-tunnel oven. A combination of convection and infra-red heating is used





Courtesy The DeVilbiss Co.

In production set-up for embossing plastisol-coated metal sheet, high-speed spraying equipment is used both to apply adhesive to sheet and, later, to apply plastisols over adhesive



Courtesy Reynolds Chemical Products Co.

Embossed plastisol-coated sheet can be formed into an automobile kick panel

to 18 in. per min.—an advantage which would be especially applicable for automatic conveyor dipping equipment.

Applications

As the foregoing discussion indicates, one of the chief advantages of the vinyl dispersions lies in the virtually limitless range of formulations which can be compounded to meet the specialized demands for metal coatings by various segments of industry. And perhaps no better testimony to the fact exists than in the wide range of applications already making use of the material and the even wider range waiting on line to take a crack at it.

The plastisols cover the field from anti-corrosion protective and insulating coatings (plastisols insulate with a dielectric strength of about 400 to 500 v./mil of thickness) to abrasion-resistant decorative finishes —from bobby pins to huge plating tanks. Their sound-deadening characteristics are used to advantage in reducing noise level by coating conveyor rollers; their resistance to moisture, fungus, and greases makes them applicable for coating wire dish drainer baskets, cables, and wiring harnesses.

Industrial applications, in addition to those mentioned above, already include finishes for plating equipment of all kinds, duct work, laboratory equipment, baskets, assembly fixtures, bus bars, pump impellers, battery cases, drum interiors, and many, many more.

Commercial applications take in coatings for interiors of dishwashing machines and vending machines, dishwasher baskets, automobile parts, office furniture and equipment, shelving for refrigerators, and novelties—and in the offing, to mention just a few under top consideration, are plastisol-coated business machines, air conditioning cabinets, decorative panels, luggage, and typewriters.

About the only limit to the possibilities seems to be the imagination of the applicators who apply the plastisol to the end-product and the manufacturers who are making use of the coatings. In the scheme of things in the vinyl dispersion industry, it is estimated that about 65 to 75% of the total output of dispersions are consumed by commercial applicators, the rest being taken care of by the large manufacturers who have their own coating equipment.

Case Studies

A random sampling of some case studies in which vinyl dispersions have solved problems of production or application serves to illustrate the extent to which dispersions are permeating the metal coatings field.

John L. Armitage & Co., Newark, N. J., for example, reports the use of its organosol textured coating for the upper instrument panel of the 1955 De Soto automobiles and for the back panels of fold-down rear seats in 1955 Plymouth and Dodge station wagons. The material has been formulated to provide a texture-finish coating with a rich leather grain appearance which is claimed to have 10 times the abra-

(*To page* 248)

Courtesy Bakelite Co.

Texture-finish organosol coating (bottom) is used on dashboard (top)

Courtesy Artwire Creations, Inc.

Plastisol coating for dish drain holder is unaffected by exposure to greases

Small-

BOSSY THE COW—Vinyl-polyethylene pull toy rolls along on molded polyethylene golf balls (see close-up at top of page). Practically indestructible, the toy wags its tail and munches a daisy while being pulled

ONE positive answer to the challenge of the infant toy market, which involves at present 17.7 million children between the ages of one and five, is given by John Burton Tigrett, head of Tigrett Industries, Jackson, Tenn., who recently announced a new line of polyethylene toys priced to retail at from 98¢ to three dollars.

Tigrett, who has for ten years made a hobby of buying up patents, is chairman of the board of the company and has a reputation for being right about toys. One of his original developments was the "Drinking Duck" which, because of its propensity toward perpetual motion by dipping its beak in a glass of water, ran up sales of over fourteen million units.

His interest in polyethylene started three years ago when his youngest boy fell on a wooden toy and cut his chin rather badly. To quote Mr. Tigrett: "At that time I thought we had better begin to give some attention to making a group of toys that were completely safe and durable for the six months to three years age group."

A break in the direction of this desire came with the development of a construction toy which required, as an important component, a ball with holes in it. The most logical material to use for these balls was polyethylene, but no production

Designed around molded polyethylene parts, a new line of low-priced toys combines play value, safety, and durability

ROLLING JOE—"Memory meter" incorporated in this vinyl push toy causes it to return to point from which it started

Fry Specials

method was then available to the company for sealing that material. Tigrett's head of research, V. F. Wigal, spent two years on the project and came up with an ingenious and still secret method of sealing polyethylene on a production scale.

There were plenty of production problems involved, particularly when it was discovered that the same polyethylene material with a different colorant will shrink to a different degree and may require a change in machine cycling. Running components at from five to eight shots a minute, it was found that cavities had to have specially good draft for easy ejection of parts, and molds required more water lines than for normal types of production.

Toy designers Kay Bojesen of Copenhagen, Denmark, and Count Maggia-Rosa of Milan, Italy, were then brought into the picture and Count Maggia-Rosa joined the organization in Tennessee. When the first models of the current line of toys had been built, Harry G. Sundheim, Jr., president of Tigrett Industries, took them on tour among large buyers and rapidly established product acceptance.

Practice Golf Balls Used

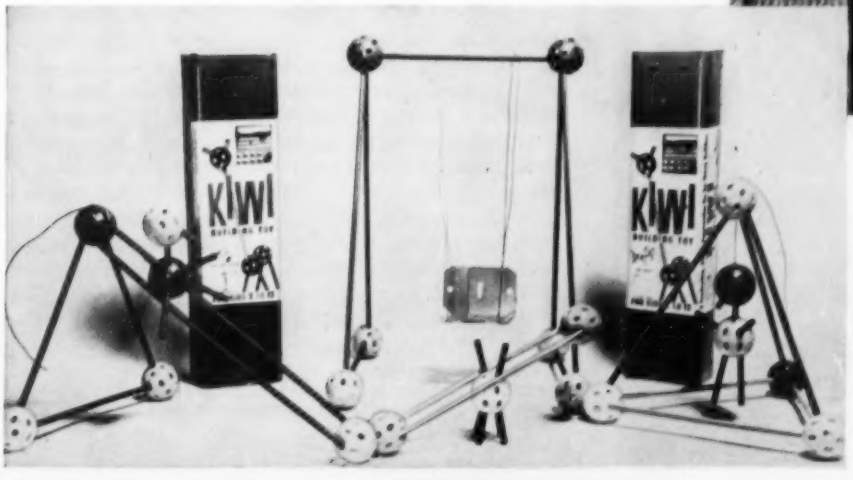
Basic element in several of the new toys is the now famous polyethylene ball with the holes in it. A

(*To page* 253)

All photos courtesy Tigrett Industries

HAPPY THE HILARIOUS HORSE—Another vinyl-polyethylene pull toy rolling on practice golf balls, in this case connected by letters and hearts. Not only is play value high, but toy will not harm tot or damage furniture

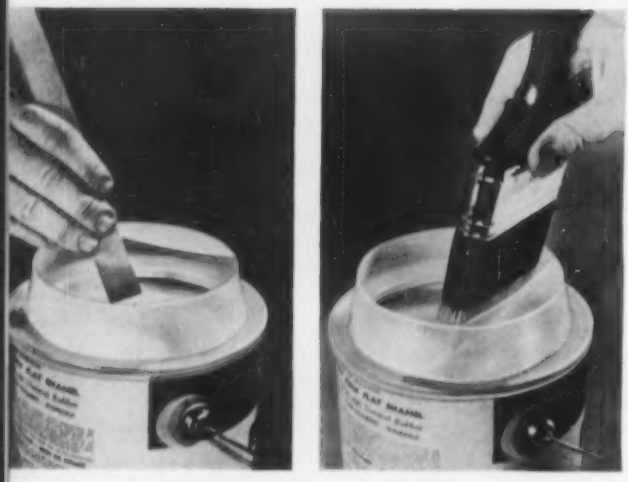
THE IMAGINATOR—Brightly colored semi-circular polyethylene sections, each joined permanently to the next and rotatable through 360 degrees, can be bent into countless forms (man, chair, house, swan, etc.) to give full range to child's imagination. There are no pieces to swallow or lose



GIANT KIWI—Construction kit contains molded polyethylene practice golf balls and sticks that can be joined together to form variety of toy structures. Because of design of balls, sticks can be inserted at many angles

PLASTICS

Polyethylene Top Keeps Paint Cans Clean



The messy job usually associated with household painting chores when an open can of paint is being used can be eliminated to a large extent by fitting a molded polyethylene collar-shaped top over the rim of the can. Resistant to the chemicals found in most paints, the tough, flexible top is also easy to install—and just as easy to remove. An undercut groove molded into the rim of the polyethylene guard simply snaps over the bead on the top of the paint can.

Once in place, the polyethylene collar keeps the rim of the can completely free of paint, it allows for extra stirring space, it keeps paint from splashing out of the can, it serves as a good pouring spout, and it is designed with a straight-edged lip for wiping excess paint from the brush.

CREDITS: The paint can tops are molded of Bakelite polyethylene by Rainbow Plastic Products, Inc., for NoMus Products, Inc., both at 6012 Wayzata Blvd., Minneapolis 16, Minn.

Decorative Water Skis

Already well known among water sport enthusiasts for their outstanding physical advantages, reinforced plastics skis in which woven cloth is being molded into the skis as an integral part of the polyester resin-fibrous glass laminate structure are now on the way to starting a new fashion trend. (See "Durable Water Skis," MODERN PLASTICS *32*, 97, May 1955.) The decorative cloth which is visible through the top surface of the skis will be made available in exclusive patterns and colors to match a popular bathing suit line that will be introduced simultaneously with the skis.

Heretofore, reinforced plastic water skis have been winning a reputation for themselves by virtue of their outstanding strength characteristics, their light weight, their moisture resistance, the smooth glossy finishes in which they are available, and the fact that they will not corrode even after continuous exposure to salt water. Now, sales appeal will be even further enhanced by the fashion note inherent in the matching ski-and-swimsuit combinations. Because the cloth is molded into the skis, it is completely protected against abrasion and water absorption.

CREDITS: Manufactured by Kimball Mfg. Corp., a wholly-owned subsidiary of Bristol-Myers Co., 1270 Pennsylvania Ave., San Francisco, Calif.; swimsuit patterns by Catalina.

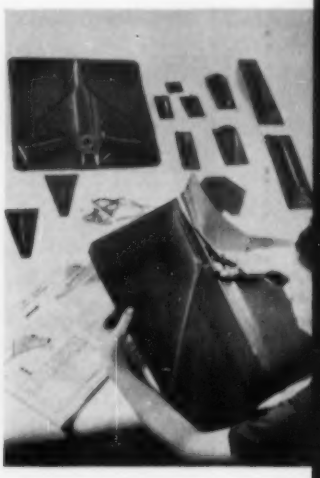
PRODUCTS

Formed Styrene Parts for Model Plane Kit

Lightweight enough (3 oz.) to gain altitude quickly and to glide effortlessly for long distances, yet tough enough to resist landing shocks, abrupt jarring stops, and the abrasion of belly landings, a realistic flying scale model of the Skyray jet fighter plane can now be assembled from a kit containing parts vacuum formed of high-impact styrene sheet.

Half sections combining delta wing and fuselage, with a wingspread of 14½ in., are quickly cut from the formed sheet and cemented together. Jet intake scoops and other Skyray parts (realistically duplicated from the original plans right down to the rivet heads) are similarly cut out with scissors and cemented onto the main section. Insignia are applied with decals to complete the model. The plane is launched with rubber bands.

CREDITS: Manufactured by Gold Brand Products, Inc., 395 Closter Rd., Closter, N. J.; sheet made of Bakelite styrene supplied by Nixon Nitration Works, Nixon, N. J.



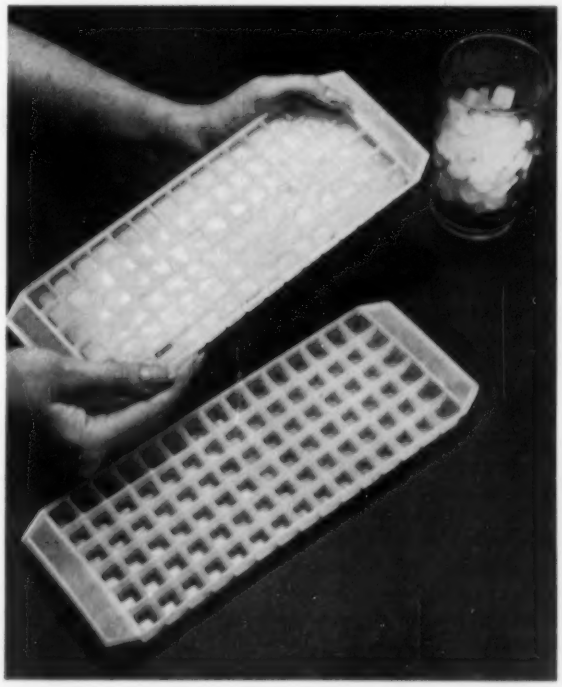
Tray for Small Ice Cubes

Very small ice cubes for rapid cooling of drinks, small enough to fit into the category of cracked or chipped ice, can now be made, 90 at a time, in a special new tray molded in one piece of polyethylene.

Unlike the conventional metal tray which requires running water to loosen the cubes, the polyethylene trays, since they do not become rigid at freezing temperatures, can be flexed to eject the cubes and will then return immediately to their original molded shape, ready for re-use. In addition, the trays are non-toxic and odorless. Dentproof and long wearing, the handsome, compact trays make a useful addition to standard refrigerator accessories.

The trays, which are of standard size for refrigerator use, are injection molded in an 8-oz. Reed-Prentice in a two-cavity hot-runner mold at the rate of 160 shots per hour. The separating walls which form the individual ice cubes are molded into the shallow tray. Overhanging lips at either end of the tray make for easier gripping when removing the tray from the refrigerator or when putting it back after use.

CREDITS: Molded for Tremax Industries, 1308 N. Halstead St., Chicago, Ill., by Anchor Plastics Co., 2108 W. Grand Ave., Chicago, Ill.; Tenite polyethylene supplied by Eastman Chemical Products, Inc.



PLASTICS

Hand-Carved Transparent Acrylic Salad Bowl

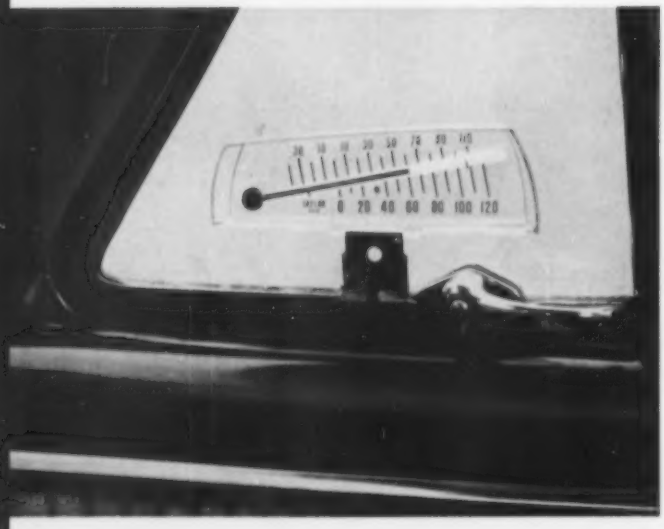
For the discriminating hostess, plastics now enter the field of quality crystal gifts with a transparent acrylic salad bowl, salad spoon, and salad fork, all three hand carved with an attractive floral pattern. The bowl, much more durable than glass but with remarkable clarity, is formed from ¼ in. thick acrylic sheet. The sheet is first heated to 300° F., clamped in a ring, and formed by blowing. After forming, it is etched by hand. Three transparent acrylic legs are cemented to the base of the bowl to complete the assembly job.

The bowl of the salad spoon and the tine of the salad fork are routed from a single block of acrylic, and also hand carved; the handles are turned down on a lathe from acrylic rod stock and cemented to the bowl and tine. The bowls are available in 5 diameters, ranging from 6 to 14 in.; the forks and spoons are available in 7-, 8-, and 9-in. lengths.

To add to the attractiveness of the salad set, both the salad bowl and the utensils are whip-sanded to give a frosted effect.

CREDITS: The bowl, spoon, and fork are a product of Hunton Plastics Co., Englewood, N. J.; CO-4 acrylic sheet is supplied by Cast Optics Corp., Riverside, Conn.

Auto-Window Thermometer Housed in Butyrate



Horizontal thermometer, housed in clear, transparent cellulose acetate butyrate, is installed on the outside of the right-hand vent windows of automobiles to give drivers or other occupants a quick check on outside temperatures without necessitating anyone having to leave the car. The exceptionally sturdy butyrate housing is unaffected by outdoor exposure and has inherent high resistance to shattering or corrosion.

The housing is injection molded in an 8-oz. Reed-Prentice in a four-cavity mold; duration of the molding cycle is 65 seconds. A steel spring clip which is pressed up and over the lower metal molding of the window for installation is molded into the bottom of the thermometer housing. The thermometer itself is set into the housing by means of metal clips. Blue graduation markings that stand out against the transparent housing are applied by the silk screen process.

CREDITS: Molded for Taylor Instrument Cos., 95 Ames St., Rochester 1, N. Y., by Michigan Panelyte Molded Plastics, Inc., Dexter, Mich.; butyrate by Eastman Chemical Products.

PRODUCTS

Giant Beach Balls Fabricated of Vinyl

As a novelty for summer beach play-time (or even as a colorful eye-catcher for display and advertising purposes), inflatable beach balls fabricated of tough 20-gage vinyl sheeting are now available in diameters of 5 to 10 feet. The over-size water toys, which can be inflated with a vacuum cleaner, can be bounced, thrown around the beach, or subjected to other abuse without tearing or abrading. Sealing the sheeting together with high-frequency electronic generators insures permanent seams which prevent air from leaking out and causing the balls to deflate.

Despite its size, the inflatable vinyl beach toy weighs only about 15 lb.—lightweight enough to be easily handled during play-time activities.

The 5-ft. diameter inflatables are being made in an attractive blue with a white net design; other colors are available upon special order. Larger vinyl beach balls in diameters up to 10 ft. can also be supplied in a wide range of custom colors that add eye-appeal to the toy's novelty appeal.

CREDITS: Beach balls are fabricated of vinyl sheeting by Bilnor Corp., 300 Morgan Ave., Brooklyn 3, N. Y.; vinyl sheeting supplied by Bakelite Co.

Plant Feeder Molded in Two Parts

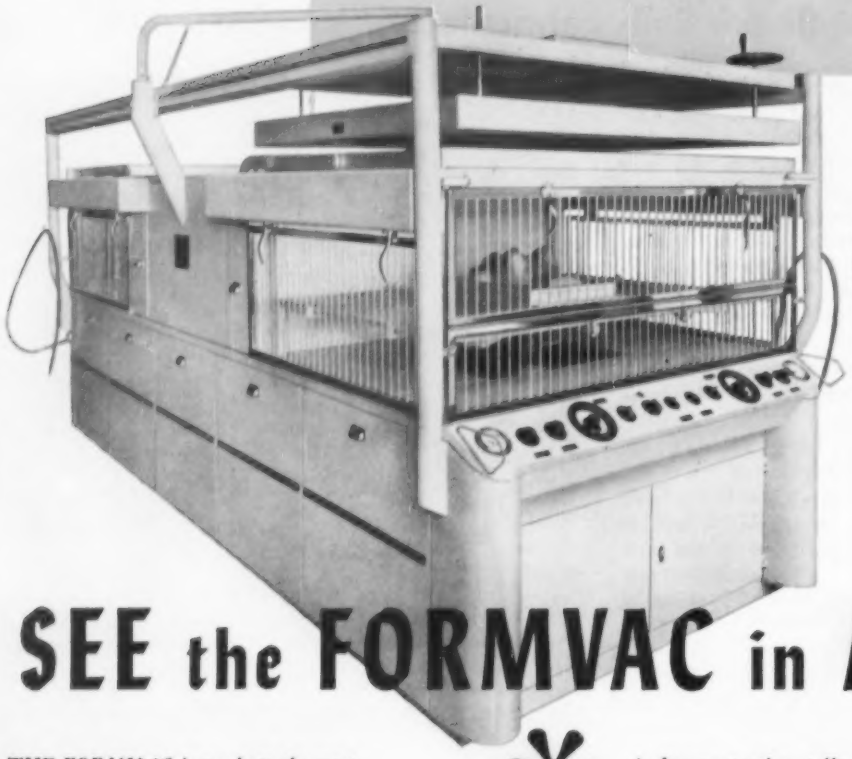
A device which can be used most anywhere in a watering system and which is designed to automatically mix soluble plant food with water from the garden hose consists of two pieces injection molded of tough, transparent cellulose acetate butyrate—a mixing chamber with two threaded connections at the bottom and a screw cap. The device may be attached between two lengths of hose, between hose and lawn sprinkler, or simply at the end of the hose. Molded markings on the feeder chamber indicate amounts of plant food needed for definite footages. After filling the chamber with plant food accordingly, the water is turned on and the feeder automatically takes care of mixing and dispensing.

The pieces are injection molded in a two-cavity mold with automatic unscrewing of the two internal and external threads in an 8-oz. Reed-Prentice. Cycle is 45 seconds.

CREDITS: Molded by Perry Plastics, Inc., 561 E. 18 St., Erie, Pa., for The Better Homes Bureau, Newark, N. Y.; butyrate supplied by Eastman Chemical Products, Inc.

* for more PROFITABLE

AUTOMATIC VACUUM FORMING



...Take a tip from the LEADERS in the plastics Industry

SEE the FORMVAC in ACTION

THE FORMVAC is made to the most demanding standards. In fact, it is setting new, higher standards for efficiency and economy combined with such flexibility that FORMVAC equipment is just as important for your replacement program as your new processing-and-vacuum-forming investment. Backed by the well-known and highly respected name of WELDING ENGINEERS, INC., the FORMVAC organization is uniquely able to coordinate an entire production system from virgin feed to the extruder . . . to finished vacuum formed product with a SINGLE, experienced engineering responsibility.

* A demonstration tells you more about the advantages of FORMVAC vacuum forming equipment than pages of words and pictures. Close inspection of the rugged, superbly engineered design and the fast-cycle, vibrationless automatic operation shows you why FORMVAC is making such progress . . . working hand-in-hand . . . with America's leaders in the drape and deep draw vacuum forming of thermoplastics. Comparison of the uniform quality production, electric power requirements, flexibility of operation . . . each put the "*this is it*" finger on the FORMVAC as a trouble-free, dependable profit maker!

FORMVAC cuts heating costs 30% to 70% • Fully synchronized automatic action • Makes the hardest jobs much easier.

FORMVAC

FORMVAC: THE ONE COMPLETE COORDINATED PRODUCTION SYSTEM

Plastic Sheet Extrusion Equipment • Plastic Sheet Extrusion Dies • Plastic Sheet Take-off Equipment • Plastic Sheet Laminating Equipment • Plastic Sheet Cutting Equipment • Vacuum Drape and Deep Drawing Equipment for Plastic Sheet • Plastic Sheet Testing Equipment

ARRANGE FOR A DEMONSTRATION NOW: For further information, demonstration appointments, sales or engineering service write FORMVAC CORPORATION (a division of Welding Engineers, Inc.), 601 West 26th Street, New York 1, N. Y. Telephone WAtkins 4-0014. Cable address Formvacor, N. Y. West Coast Representatives (California, Arizona, Nevada): MACHINERY SALES CO., 2838 Leonis Boulevard, Los Angeles 58, California. Telephone LUdlow 8-8111.

Quality Control for Custom Molders

Stripped of the symbolism of higher mathematics, a plan is presented which the practical engineer can readily apply to up-grade the quality of molded plastics parts

by JOHN B. WHITTED, JR.†

THE phrase "quality control" has become well known throughout all fields of manufacture but, unfortunately, is employed with varying degrees of intent and understanding.

Both "quality" and "control" are relative terms. Thus, there are manufacturers whose product quality satisfies their customers and there are others who proclaim that their products are quality products, regardless of whether or not "controls" are used in production. Still others employ certain statistical techniques and recognized sampling plans. Finally, there is a group of "high priests" who seemingly would veil the practice of quality control with a mysterious form of occult magic, known as statistical quality control. The resulting confusion is such that anyone who knows a statistic from a logistic can quite legitimately claim that his "quality" is "controlled."

Writings on the subject of quality control are often confined to a highly detailed mathematical analysis of one particular tool out of the many available. The problem of converting such a series of complex mathematical formulas into a planned program for controlling quality can be baffling indeed. However, out of the maze can be extracted certain fundamentals that can be adopted as a basic "package" applicable to plastics molding processes.

The following discussion of such a "package" deals with thermosetting molding, simply because the writer's experience has been confined to that field, but is equally applicable to thermoplastics molding procedures. In it, the application phases of the "package" for statistical quality control will be considered approximately in the order in which they normally arise in everyday operations.

Quotation on a Job

At the job quotation stage, the alert custom molder will first determine whether the tolerances shown on his customer's drawing are within the range of "natural tolerances" of the material specified. A systematic program of experimentation on process capability will aid the molder considerably by sharpening his judgment of tolerances.

In the case of general-purpose phenolics, the results of our tests have shown that, *on the average*,

Typical quality control operation: process variability test is being performed in laboratory to determine the breakdown voltage of a batch of standoff insulators

All photos courtesy Whitso, Inc. and Marion Molding Corp.

Dial indicators find frequent application in quality control work. They contribute to uniformity of measurement by acting to minimize the element of human error

* Reg. U.S. Pat. Off.
† Vice president, Whitso, Inc., and Marion Molding Corp.

Toolmaker's microscope is useful for checking hole centers in new molds

natural variability approximates ±0.001 in. less than the values of the slope of the S.P.I. fine tolerance line[1], or just barely enough for tooling tolerance and slight error in shrinkage anticipation.

Designing the Mold

Shrinkage—After a quotation has resulted in an order, the next move is to construct the mold. Perhaps the major problem here is precisely what shrinkage to allow. This is an excellent subject for experimentation, ideally with a sample cavity, but more commonly with a similar part run in the same material and under, as nearly as possible, the same conditions of temperature, pressure, runner and gating layout, etc.

Assume that such a similar job is in current production. Knowing that parts from the same cavity will vary in dimension, the objective is to determine the *average* (mean) shrinkage. It is pertinent here to define the nature of the measurement sought. The ideal objective is to find the mean value for an *infinite* quantity of parts, but this is obviously impossible. The best that can be done is to estimate this value from a sampling. The mean of this sampling will not be exactly the same as the mean of an infinite quantity of parts, but accuracy of estimate will increase as the size of the samplings increases.

Since the parts must be measured (preferably to the nearest 0.0001 in.), the question arises as to how many parts should be measured. One part is obviously not enough; 1000 parts are generally many more than necessary. It is here that statistics can be of aid. Without dwelling upon pertinent theories, it can be said that, broadly, for a given degree of accuracy, the number of the sampling must be increased as variability increases. Variability, in turn, is directly affected by the size of the dimension, i.e., the larger the dimension the more samples are needed.

The following formula[2] will, 95 times out of 100, yield a mean value within ± 0.0004 in. of the true mean:

$$n = (1.7T)^2$$

where n = the minimum number of samples to be measured and T = plus or minus the natural tolerance, expressed in thousandths of an inch.

For example, consider a 1-in. dimension to have a variability per S.P.I. fine tolerance of ± 0.0026 inch: then $T = 2.6$. Therefore

$$n = (1.7 \times 2.6)^2 = 20$$

Twenty samples, therefore, would normally be sufficient for shrinkage determination of a 1-in. dimension and, as stated above, the chances are 95 out of 100 that the mean of these measurements would be within 0.0004 in. of the mean of the entire lot from which they were drawn. The accompanying chart shows this condition for general-purpose phenolics (based upon S.P.I. fine tolerances); similar schedules are quite easily arrived at for any material by substituting for T in the formula above.

The next consideration is the manner in which the samples are taken. For theory to work in practice it is important that the samples be selected at random. For the average small molded part this is easily accomplished by tumbling, which insures that every part in the lot has an equal chance of being chosen. Incidentally, if the sampling can be "stratified," the result will be improved. For instance, if 30 samples are required, 10 parts randomly chosen from *each* of three shifts would be a better sampling than 30 parts from a combined production of three shifts.

Variability—There is further information to be gained from these samples. A prediction of dispersion, or natural tolerance, can be based upon them. The technical measure of dispersion is the *standard deviation*, sometimes designated *sigma* (σ). Normally, all but three pieces out of a thousand will be within ± 3 sigma. A very close approximation of this natural tolerance may be made by the following method:

1) Record the *range* (difference between largest and smallest part) for each sub-group of five parts.

2) Calculate the average (mean) range ($\bar{R}$) for all sub-groups in the sample.

3) Natural tolerance = $\pm 1.29\bar{R}$.

This procedure is known as a "Process Variability Test." It is suggested that no less than 25 samples (five sub-groups) be selected for measurement in such a test. This technique is often useful as a trouble-shooting device.

Mold Specifications—Having determined the average shrinkage per inch by comparing the mean value of the part measurements with the corresponding mold measurement, it is possible to determine the nominal mold dimensions. Further, knowing the natural tolerance to be expected in production, mold-making tolerances can be intelligently assigned. It is important here that actual mold dimensions *plus tolerances* be assigned to each dimension of the mold. This approach should be an integral part of a planned program of controlled quality.

In some molding plants it is not customary to make detailed cavity drawings. A useful device here is to assign a number to each dimension of the customer's drawing, and to specify by number what that dimension shall be in the mold, together with tolerance. For example, a certain dimension on the customer's drawing may be 1.000 ± 0.005. The mold-maker might receive this as 1.008 ± 0.002.

One of the greatest advantages of complete specifications is to require

[1] "Plastics Engineering Handbook," p. 442 (Reinhold Publishing Corp., 1954)

[2] Derived from $n = \left(\frac{\sigma}{\sigma_{\bar{x}}}\right)^2$, where $\sigma = 0.0002$ inch.

the close attention of the molder to each separate piece dimension, at a time when he can anticipate such matters as the effect of flash, warpage, parting line variability, mold wear or rework, function of the dimension, etc. This is certainly not to imply that attention to detail is uncommon among molders, but rather to emphasize the advantages of the most careful scrutiny of a new mold in advance of its construction.

It is timely at this point to recall the truism that quality cannot be *inspected* into a part, but must be *built* in.[3] The most important determinant of quality must thus be accurate anticipation of average shrinkage.

First Part Samples

After the mold is constructed, it is usual to submit one or more "shots" to the customer for dimensional inspection. Since this first part inspection will probably be done very carefully, and the results recorded, a shot should be selected which is typical of anticipated production.

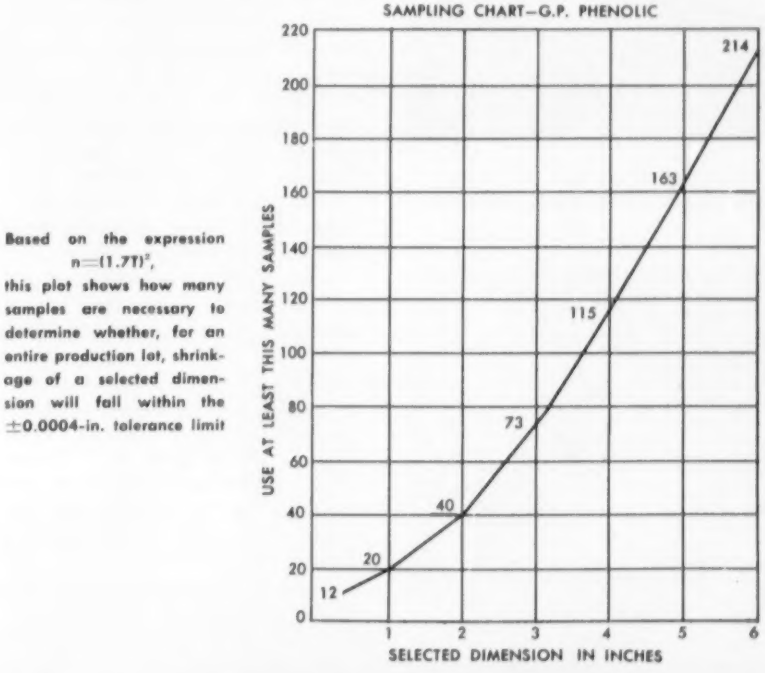
This is another way of saying that parts submitted for approval should have dimensions as close as possible to the mean dimensions of future production. One convenient method of accomplishing this for multiple cavity molds is to keep a separate number of shots intact (say 10) for inspection. Then choose *any* easily measured dimension (the larger the better), and record the exact measurements of parts from the same cavity on each shot, always identifying the parts measured with the shot from which they were taken. Calculate the mean of these measurements. The shot or shots closest to the mean should be chosen for inspection. In this way some assurance is obtained that "mavericks" have been eliminated. The purpose of keeping the shot intact is, of course, to preserve the relation of cavity dimensions to each other.

It happens at times that certain dimensions of a new mold may be found out of tolerance. Assuming that the customer may have some latitude and is willing to modify his specifications slightly, it is then up to the molder to advise his customer exactly what dimensional changes are required to agree with the parts as the mold will produce them. This is the occasion for a Process Variability Test, previously described. The results of such a test will give the best available prediction of future dimensional performance.

In-Process Controls

If the mold is properly constructed, the bulk of the dimensions of the parts produced from it will normally be within specification limits. Occasionally, however, there may be a particular close dimension which the molding process is just barely capable of holding. Problems of warpage or eccentricity frequently present this situation.

It is highly desirable that the molder know *as the parts are being produced* whether his process is holding within specifications. One



Based on the expression $n=(1.7T)^2$, this plot shows how many samples are necessary to determine whether, for an entire production lot, shrinkage of a selected dimension will fall within the ±0.0004-in. tolerance limit

Member of quality control staff, using pre-control (P-C) gaging technique, makes in-process inspection of compression molded piece to check accuracy of the molding operation

[3] "Statistical Quality Control is 90% engineering and only 10% statistics." H. F. Dodge

Process variability test of molded part provides data for predicting natural tolerance

New mold is checked for conformity with tooling control specifications

Final inspection of inside diameter of a bobbin, according to MIL-STD-105A. The circular slide rule at left on the table is used by inspector to determine sample size and quantities for acceptance or rejection of lot

solution is 100% gaging at the press. This may not be practical, however, with fast-running multiple cavity molds. Here, mathematical statistics can again be of assistance in the "Control Chart" technique, which is employed in several forms. Generally speaking, its purpose is to accept variations caused purely by chance, while spotlighting variations which indicate an actual change.

Proper use of this procedure cannot be fully detailed here. However, one technique should be mentioned because of its simplicity and its adaptability to the go no-go technique of gaging. This method, called "Quality Pre-control,"[4] statistically duplicates the conventional $\bar{X}$-R control chart device, but is considerably more simple to administer. Essentially, it works as follows:

1) Determine pre-control (P-C) limits as being $\pm$ ½ the specification tolerance from the specification mean.

2) Inspect until 12 consecutive pieces are found within P-C limits. (In the case of a multiple cavity mold, 12 parts from each cavity would be required; whenever any particular cavity has met this requirement it is eligible for reduced inspection.)

[4] Copyright, Jones & Lamson Machine Co.

3) Thereafter, inspect only two consecutive pieces (from each cavity) at regular intervals, perhaps hourly. If *either* part is within P-C limits, the process is in control.

There is somewhat more to the technique than this, and the purpose of describing these steps is to interest—not instruct—the reader in its use. The complete technique is available upon request.[5] The real usefulness of such control devices is to alert the molding foreman that trouble shooting is necessary. It must always be kept in mind, however, when using in-process statistical controls, that false alarms may occasionally occur, typically three times in one thousand.

Sampling Plans

One pitfall in the field of sampling inspection which must be avoided is the practice (fortunately rare) of sampling a given percentage of the lot, without regard to lot size. The accuracy of a sampling will increase as the absolute number of samples increases, almost without regard to lot size.

Any sound program of quality control must therefore include a scientific inspection sampling plan. There are many such plans available, but MIL-STD-105A[6] is recommended as being the most widely used and understood. In the use of MIL-STD-105A, the proper AQL (corresponding roughly to maximum allowable percent defective) must be selected. This is often specified by the customer. In the absence of any specific agreement, it is suggested that an AQL of 2.5 should normally be satisfactory. The effect of this is that in repeated sampling a lot exactly 2.5% defective will be accepted 80% or more of the time.[7] (There is *always* a risk of error in *any* sampling plan.[8] The value of such plans is that this risk is predetermined and understood.)

MIL-STD-105A presents plans for single sampling, double sampling, and multiple sampling. It is suggested that multiple sampling will probably be the most economical; i.e., will result in the least number of parts inspected before a decision is

(*To page* 254)

[5] From Jones & Lamson Machine Co. (Advertising Dept.), Springfield, Vt.
[6] Obtainable from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price 30 cents.
[7] This characteristic is called Probability of Acceptance (P_a), which increases with the lot sizes.
[8] "Certainty is but an illusion; repose is not the destiny of mankind."—O. W. Holmes, Jr.

Low-Cost Molds for Short Runs

Cast molds, composed of powdered metal and catalyzed thermosetting resin, oven cured, can be produced in a matter of hours

by A. M. CREIGHTON, JR.*

A NEW casting material for producing inexpensive compression and injection molds in a matter of a few hours now makes it possible to mold samples or short production runs at a fraction of the cost when machined molds are used. The material, known as Devcon C, is composed of approximately 80% powdered metal (aluminum and steel) and 20% specially compounded thermosetting resin. The mix is actuated by a powdered catalyst and final cure is achieved in an oven.

Not only are molds cast from this material low in cost, but, by their use, accurate molded samples can be exhibited in a matter of a couple of days after the model is completed.

The finished die is neither as strong nor as hard as steel, but it is extremely tough; compressive strength is over 5000 p.s.i. at 400° F. Although the heat transfer property of the material is not as good as that of steel, once the mold has been brought up to temperature it will hold its heat extremely well. If very quick heating or cooling is essential, a small coil of tubing for steam or cold water can be imbedded in the material.

Devcon C has practically no shrinkage or distortion during hardening. For example, on a mold measuring 5 by 3 by ¾ in., the shrinkage was approximately 0.0005 in. per inch. Once the material has hardened, it can be drilled, ground, threaded, or otherwise machined with standard metalworking tools.

The single-cavity mold shown in Fig. 1 was used to produce a part from high-impact phenolic material. Mold temperature was 350° F. and molding pressure 10,000 p.s.i. The curing cycle was 3 minutes.

Total working time required for making the entire mold, not including the model, guide pins, or elapsed time for oven cure, was 1 hr. 50 min-

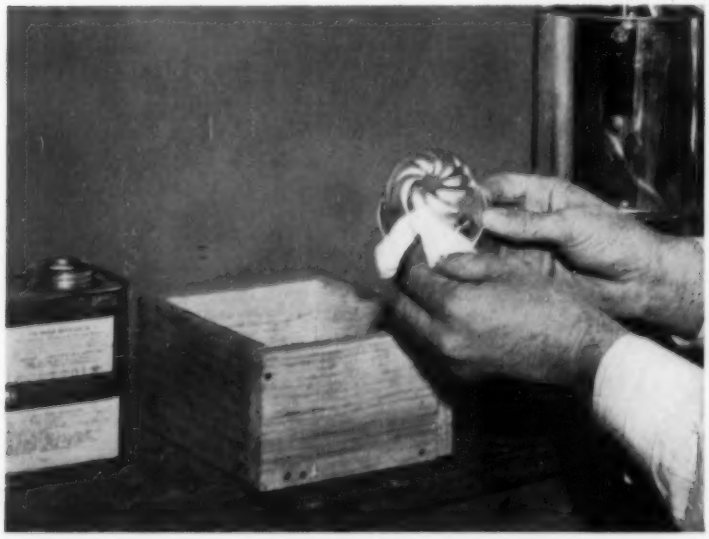
* President, Chemical Development Corp., Danvers, Mass.

Fig. 1—Molded phenolic part is removed from quickly cast mold
Courtesy Northern Industrial Chemical Co.

Fig. 2—Parting agent is applied to model before putting it in casting box

Fig. 3—Catalyst is added to heated casting mixture

Photos courtesy Chemical Development Corp.



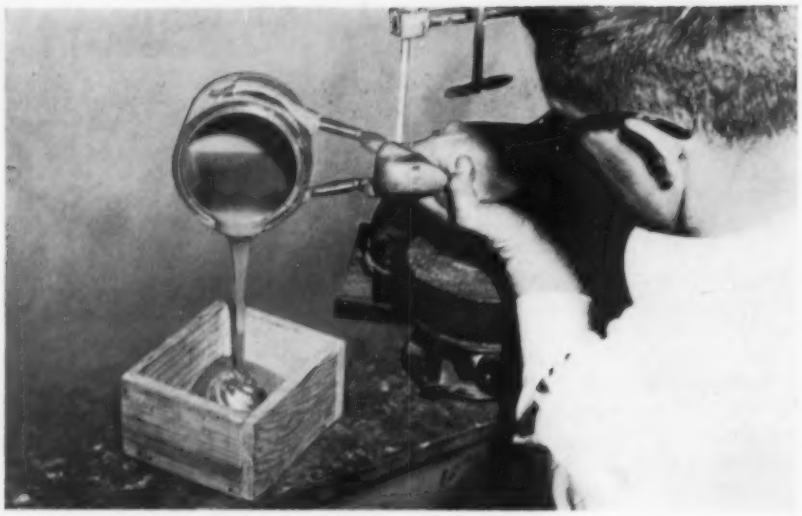


Fig. 4—Catalyzed material is poured into casting box around male model to produce the cavity part of the compression mold

Photos courtesy Chemical Development Corp.

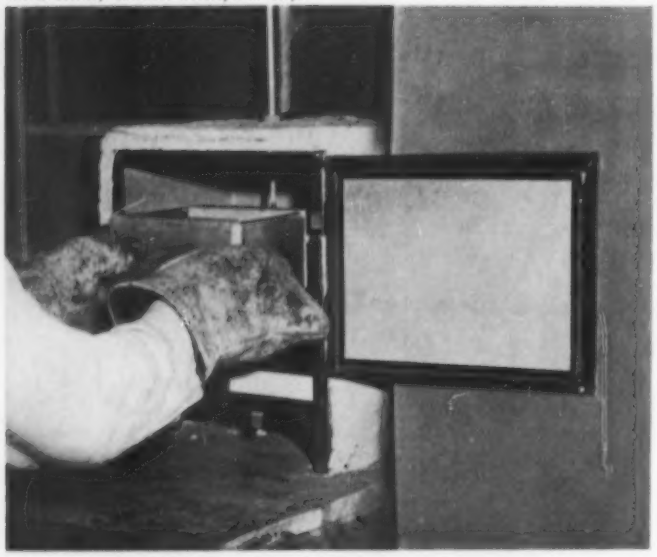


Fig. 5—Partially filled casting box is placed in oven for cure at 250° F.

Fig. 6—Parting agent is applied to surface of cast female and model

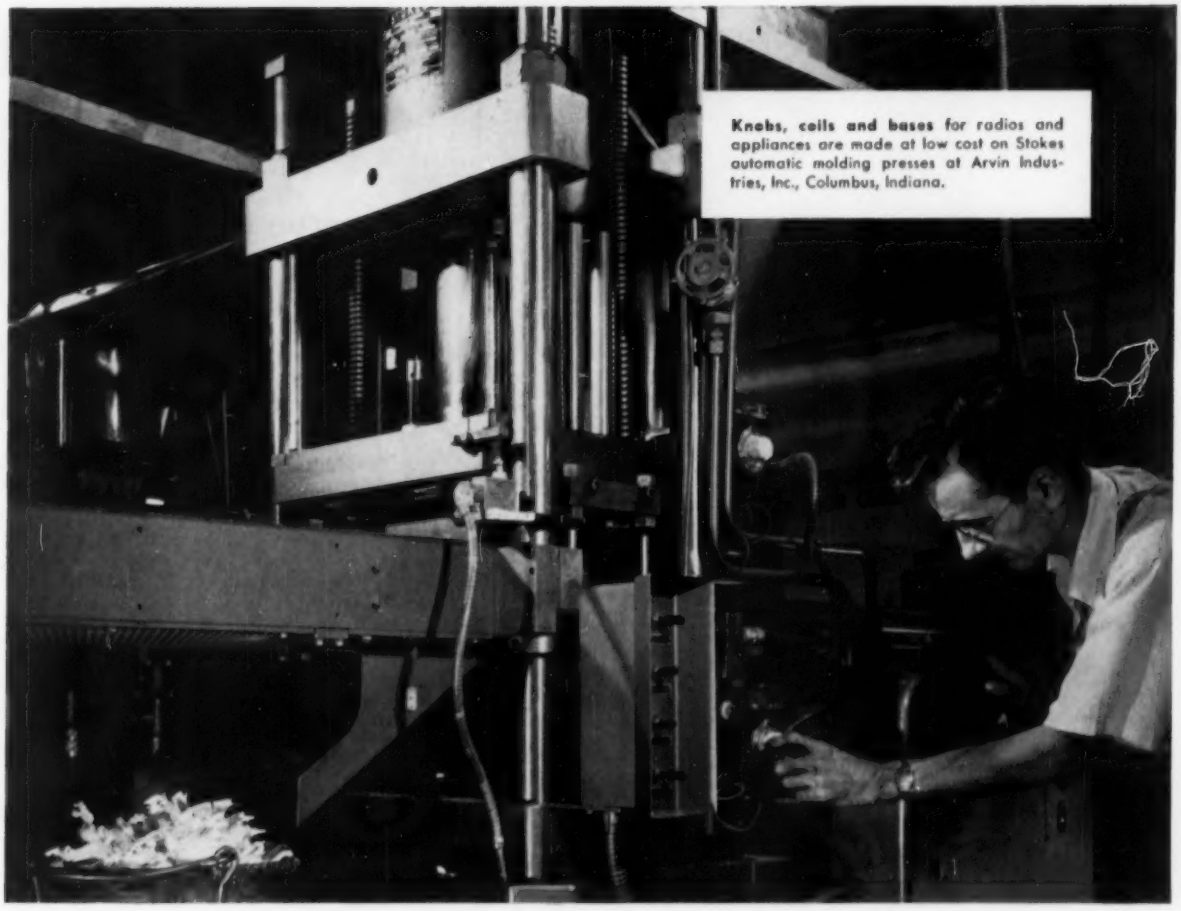
utes. The addition of the guide pins and one backing-up plate required approximately 3 hr. of work.

In Fig. 2, a parting or release agent is being applied to the model, an exact replica of the molded part to be made, before positioning in the casting box. In preparing the Devcon C for casting, the material must first be heated to approximately 250° F., at which temperature it has the consistency of thin molasses. The powdered catalyst is then slowly added (Fig. 3) while the liquid is being constantly stirred. The material, now ready for pouring, has a working time of approximately ½ hour. The catalyzed material is now poured into the mold box and around the male model (Fig. 4) to prepare the cavity or female of the compression mold. The entire mold box is then placed in an oven (Fig. 5) and cured for about 1 hr. at 250° F. Oven cure is necessary because the catalyzed reaction is not exothermic.

Force Plug Also Cast

Casting the male or force plug section of the mold is the next step. The mold box is inverted and the bottom plate removed, after which the hardened mold section is forced downward so that sufficient space remains in the mold box to cast the force plug. Figure 6 shows the hardened cavity ready for pouring the force plug. The model remains in position in the casting material and a parting agent is applied to the surface of the hardened cast female as well as to the model.

After preparing a second batch of



Knobs, coils and bases for radios and appliances are made at low cost on Stokes automatic molding presses at Arvin Industries, Inc., Columbus, Indiana.

Automatic Molding cuts costs for Arvin Industries

Typical appliance parts made by automatic molding at Arvin.

Stokes automatics produce uniform, high quality radio and appliance parts.

For 23 years, Arvin Industries, Inc., has been a leading supplier of portable electric heaters for the home. To maintain this pre-eminent position, costs must be kept under strict control so that a quality product can be sold at an attractive price.

Stokes automatic compression molding presses are helping Arvin hold the line on prices. The Model 741 press molds temperature control knobs for Arvin heaters; a Stokes Model 800 turns out a variety of plastic parts for radios, another important Arvin product. Fully automatic operation means low labor charges for these Stokes machines and a substantial cost saving over semi-automatic operation.

Stokes has had 20 years experience in the design and application of presses for automatic molding. The latest achievement of this unequalled engineering background is a new rope feeding attachment on the 50-ton Model 741 for the automatic molding of glass-fiber reinforced polyester resins. Another recent Stokes modification of the Model 741 makes possible the automatic molding of coil forms and other parts with undercuts, affording molders vast new fields of opportunity.

You may be surprised at the cost advantages which lie in automatic molding. Send for Stokes revised brochure on Fully Automatic Injection and Compression Molding and Bulletin 525 describing the Models 741 and 800.

F. J. Stokes Machine Co., Phila. 20, Pa.

OFFICES IN PRINCIPAL CITIES, REPRESENTATIVES THROUGHOUT THE WORLD

STOKES

Courtesy Chemical Development Corp.

Fig. 7—Casting mixture is poured into box until it is full

Courtesy Chemical Development Corp.

Fig. 8—Disassembled mold box, showing force plug and cavity

casting material, the operator pours the viscous liquid onto the model and continues to pour (Fig. 7) until the mold box is full. The mold box is then replaced in the oven and the entire assembly is cured for 1 hr. at 250° F., after which the oven temperature is raised to 350° F. for a final 1-hr. cure. This second cure cycle does not affect the properties of the material first cast for the female part of the mold.

Figure 8 shows the dis-assembled mold box and the force plug and cavity of the mold after the model has been removed. After squaring up, locating and assembling guide pins and back-up plates, the mold is ready for operation.

A four-cavity injection mold made of Devcon C, set up in a Van Dorn injection machine, was used for molding small polystyrene parts as in Fig. 9. The working time required in making the cast sections of this mold was exactly 2 hours. The molds in Figs. 1 and 9 were run at the Nothern Industrial Chemical Co., which was responsible for much of the early evaluation of this material.

Hans Wanders, vice president of Northern Industrial, states that, through the use of Devcon C, "we will now be able to be of even greater service to our customers when quick service runs are required."

Devcon C is not intended to replace presently used mold making materials. Rather, it will complement them by making it possible for a molder to produce samples or short runs quickly and at low cost.

Courtesy Northern Industrial Chemical Co.

Fig. 9—Four-cavity mold for the production of small polystyrene parts was cast of plastic-metal material in about 2 hours

Reinforced Polyester Premixes

How to Make and Mold Them

by W. O. ERICKSON and W. R. AHRBERG

PREMIX or "gunk" molding offers a means for making reinforced plastics parts with less critical requirements at considerably lower cost than by mat or preform molding. Premixing makes possible the rapid molding of parts with varying wall thickness, intricate contours, and molded-in inserts. Serviceability rather than precise physical properties should determine the suitability of this method for a given application.

Mixing Equipment

Laboratory and production studies have demonstrated that the most satisfactory mixer for "gunk" is a double-blade rectangular trough-type kneader which may be equipped with either 180° spiral blades or sigma blades.

There should be a ¼- to ⅜-in. clearance between the blade edge and the shell to prevent jamming of the blades and excessive degradation of the glass fibers.

The recommended range of blade speed is 20 to 35 r.p.m. If the blade speed is too slow, the rate of mixing is low and abnormal cycle time results. If, instead, it is too high, the mix becomes overworked, causing degradation of the glass fibers and overheating.

Owing to the high viscosity of premix compounds, considerable friction is developed during mixing. This causes a build-up of heat in the mix which may become excessive and result in reduced stability, pregel of the resin, and considerable loss of monomer in resins containing volatile monomer; e.g., styrene or vinyltoluene. The temperature of the mass should not be permitted to exceed 125° F. In small mixes, heat build-up is ordinarily not much of a problem; however, in batches of 50 lb. or more, the mixer should be jacketed to provide water cooling.

Table I, p. 126, shows working capacities, power requirements, and approximate cost of mixers appropriate for the indicated batch sizes. Mixer recommendations are based upon a premix compound having a specific gravity of 1.8 in the uncured state.

Ingredients

The following ingredients are generally found in premix compounds: 1) resin, 2) filler, 3) reinforcement, 4) catalyst, 5) pigment, and 6) internal mold lubricant.

1) Resin: As in mat or preform molding, the selection of the resin is governed to a great extent by part design and service requirements. However, there are certain basic differences between preform or mat molding and premix molding which must be kept in mind. The most important of these are the method of contacting the resin with the reinforcement and the function of the resin during the flow of the compound under molding pressure. Generally speaking, it is desirable to use specially developed premix resins.

Because of the heat generated during the mixing operation, the volatility of the monomer is an important factor. The three monomers generally used in polyester resins are diallyl phthalate, vinyltoluene, and styrene. On the basis of volatility, diallyl phthalate is the preferred monomer. Both vinyltoluene and styrene are volatile monomers, but the lower volatility of the vinyltoluene makes it preferred over styrene. Volatility is also important during storage of the mixes. Unless suitable precautions are taken, the surfaces of mixes made with volatile monomers tend to dry out, affecting adversely the uniformity and, consequently, the moldability of the compound.

Another function of the resin in premix molding is to carry the filler and the reinforcement to all parts of the mold. In general, the higher the viscosity of the resin, the better it will perform this function. While 25 poise approaches a maximum resin viscosity in mat molding, it would be considered a minimum in premix since resin viscosities as high as 2500 poise are in use.

2) Filler: Several mineral fillers are satisfactory for use in premix including clay, ground limestone or whiting, gypsum, and talc. The most widely used are clay and ground limestone (calcium carbonate). The principal advantage of clay is that it provides longer shelf life. However, because of its comparatively high oil absorption, clay reduces plasticity more rapidly than does ground limestone, and, therefore, the resin content of a clay mix must be higher. Ground limestone, on the other hand, has low oil absorption which means that more of it can be used and resin requirements can be lower. The over-all cost of the mix is, therefore, somewhat lower. Ground limestone provides a white base which is very desirable for coloring. Although ground limestone

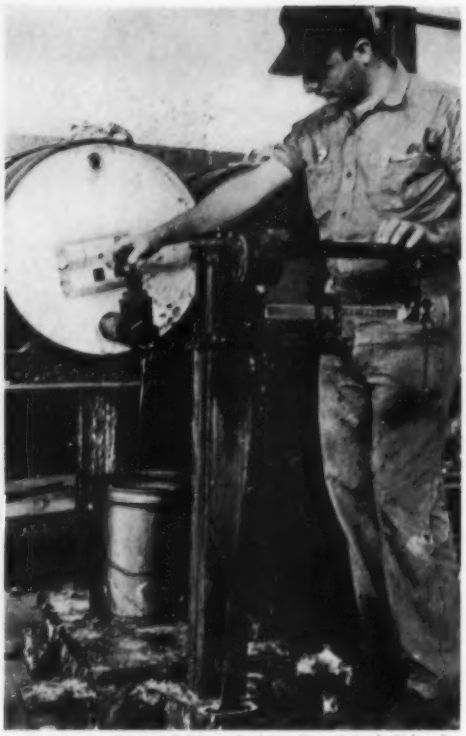
THE AUTHORS

Warren O. Erickson has charge of the development of Plaskon polyester resins and technical service for the Barrett Div., Allied Chemical & Dye Corp. Both undergraduate and graduate studies were taken at the University of Wisconsin. Mr. Erickson is a member of the Corrugated Panel and the Policy Committees of the Reinforced Plastics Section of the S.P.I., of the American Chemical Society, and of Phi Beta Kappa.

W. R. Ahrberg, a member of the Plaskon polyester technical service dept. since 1953, graduated from the University of Toledo in 1939 with a Bachelor of Science degree in chemistry. He served with the DeVilbiss Co. as rubber chemist from 1939 to 1953 where he was primarily involved in developmental compounding and testing of rubber and various synthetic elastomers.

Courtesy Barrett Div., Allied Chemical & Dye Corp.

Typical ingredients for premix molding compound: The two large pans contain ½-in. chopped glass fibers (left) and clay filler (right). The smaller pan in left foreground contains zinc stearate, an internal mold lubricant. The small beaker in left foreground contains black iron oxide pigment, and the small beaker to the right holds benzoyl peroxide paste catalyst. The large beaker contains a polyester resin of the vinyltoluene type, specially formulated for use in premix molding. In the background is a laboratory-type Day mixer equipped with sigma blades



Courtesy Fabricon Products, Div. of Eagle-Picher Co.

Amount of polyester resin required for premix formulation is drawn and carefully weighed out on balance scale

mixes exhibit a shorter shelf life than clay mixes, shelf life is of sufficient length for normal production practices.

3) Reinforcement: Chopped fibrous glass is the most widely used reinforcing material. Other materials such as sisal and asbestos are of interest for specific applications.

In premix molding, optimum physical properties are obtained with a fibrous glass length of ½ inch. The selection of a ½-in. fiber length is based upon the fact that shorter fiber lengths do not provide sufficient reinforcement, whereas fiber lengths in excess of ½ in. have the disadvantage of not dispersing as well in the mix and of being susceptible to a higher degree of degradation during mixing. In molding, long fibers do not flow as well—particularly in the case of comparatively thin sections or inserts. Chrome- or silane-finished glass is recommended, since either finish permits maximum wetting of the glass fibers by the resin. For those applications in which minimum water absorption is required, the silane finish should be selected.

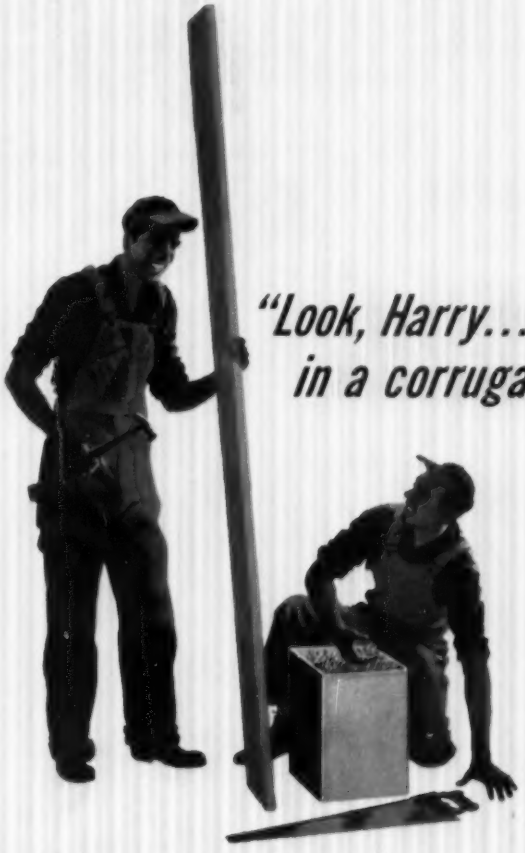
Chopped glass fibers ½ in. long are commercially available. Roving can be used by chopping the glass directly into the mixer. Scrap glass such as trimmings from random mat can be used in premix if they are first run through a hammer mill, but variabilty of physical properties increases because of reduced uniformity of fiber length.

The normal range of glass content is 5 to 35% of the mix. Glass contents up to 20% produce compounds which are fairly plastic, are easily preformed, and flow readily under pressure. When the glass content exceeds 20%, the compounds become progressively more fluffy and springlike; they do not lend themselves to preforming and do not flow as easily.

For applications requiring increased impact strength, but no greater flexural strength than that imparted by the resin, sisal fibers are indicated. They have a lower specific gravity than glass and cost approximately one-half as much as glass. The maximum loading with sisal is approximately 20%, with 5 to 10% being in a more easy-to-

Table I—Mixers for Premix

Batch size, lb.	12	50	100	175	250	500
Working capacity, gal.	2.25	10.0	20.0	35.0	50.0	100.0
Drive motor, hp.	2	7.5	15	25	30	50
R.p.m.	Geared head	900	900	900	900	900
Approximate cost (Sept. 1955)	$1757	$5800	$7100	$8000	$9000	$13,000



"Look, Harry... nails in a corrugated box!"

Know why? Because H&D's practical Hevi-Duty box weighs only half as much as the wooden nail keg... takes a quarter less space ... stacks more neatly, handles easier, puts together faster, provides excellent printing space and costs much less in the first place.

Small wonder nail-makers (and countless other manufacturers) are turning to corrugated packaging in general... to Hinde & Dauch in particular. Why not let us solve your packaging problem?

HINDE & DAUCH

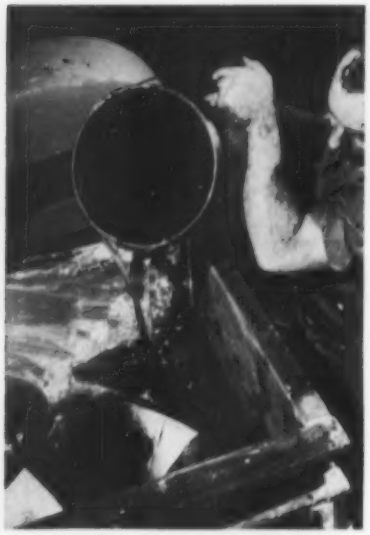
Division of West Virginia Pulp and Paper Company

AUTHORITY ON PACKAGING • SANDUSKY, OHIO
13 FACTORIES • 40 SALES OFFICES

handle range. The fibers do not appear to wet as well as glass and a noticeable straw-like pattern develops on the molded surface. Some fabricators are taking advantage of this pattern to promote surface configurations made by sisal. However, sisal should not be considered for applications in which water absorption is critical. Sisal fibers should be straight and ¼ to ½ in. long.

4) Catalyst: Benzoyl peroxide paste catalyst is the best all-around premix catalyst.

5) Pigment: In general, pigments which can be used with polyesters for preform molding are satisfactory for premix. The range of ½ to 3 parts of pigment paste per 100 parts resin is customary.



Measured amount of polyester is added to other ingredients in mixer

Photos courtesy Fabricon Products, Div. of Eagle-Picher Co.

After batch of premix has been thoroughly blended, chopped fibrous glass is added

6) Internal Mold Lubricants: For satisfactory mold release characteristics, the use of internal mold lubricants such as stearic acid and zinc or magnesium stearate is required. For molding temperatures up to 270° F., stearic acid provides excellent release and is the recommended lubricant. From 270 to 310° F., zinc or magnesium stearate is recommended. Concentration should be 1.0 to 1.25% of lubricant based on total mix weight.

Mixing Technique

The suggested procedure for mixing is as follows:

Start—Add dry filler (clay, limestone, etc.) and lubricant (stearic acid, zinc stearate, etc.) to mixer and start blades. **1 min.**—Add resin, catalyst, and color to mixer and allow to blend thoroughly. **5 to 20 min.**—Add glass carefully to prevent agglomeration and consequent poor wetting and dispersion. **20 to 30 min.**—Glass addition complete, allow to mix thoroughly. **30 to 45 min.**—Mix complete. Dump.

As is indicated, the cycle times are approximate and should be adjusted to meet the requirements of particular mixes or batch sizes.

The resin-filler mix should be a smooth paste prior to the addition of the glass. Although careful addition of glass, by hand, is satisfactory, it is more efficient to run roving through an automatic cutter directly into the mixer. After glass addition is complete, mixing should continue until a thorough dispersion is assured and the glass fibers are well wetted. Over-mixing should be avoided because it results in excessive degradation of the glass fibers and lowering of physical strength.

Table II—Premix Molding Pressures

Projected area of mold, sq. in.	Pressure on projected area of mold, p.s.i.	Tonnage of press required
100	500	25
	1000	50
	1500	75
	2000	100
500	500	125
	1000	250
	1500	375
	2000	500
1000	500	250
	1000	500
	1500	750
	2000	1000

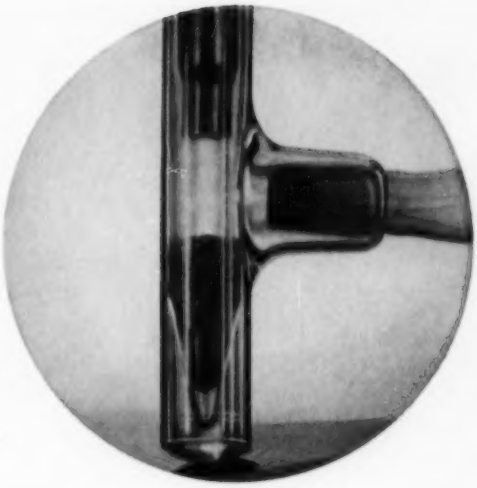
After the mix has been permitted to cool approximately for 10 min., it should be stored in a tightly sealed fibre drum lined with polyethylene or cellophane. This is of particular importance when volatile monomer resins are used because the loss of monomer on exposure will dry a mix and cause it to become unusable in a short period of time.

The mixing equipment may be cleaned with one of several available solvents. Methylene chloride is recommended because it is non-flammable. A small quantity of chopped glass added to the methylene chloride helps to remove solid chunks of material. Mixing and cleaning operations should be conducted in a well-ventilated area.

Storage

Premix compounds have limited stability. Volatile monomer resin mixes tend to become unusable at a faster rate than diallyl phthalate type resins. Various complicating factors reduce storage stability. Clay mixes are generally more stable than those containing calcium carbonate, although mixes made with the ground limestone have comparatively good shelf life. Another factor is color, inasmuch as certain pigments, particularly some types of

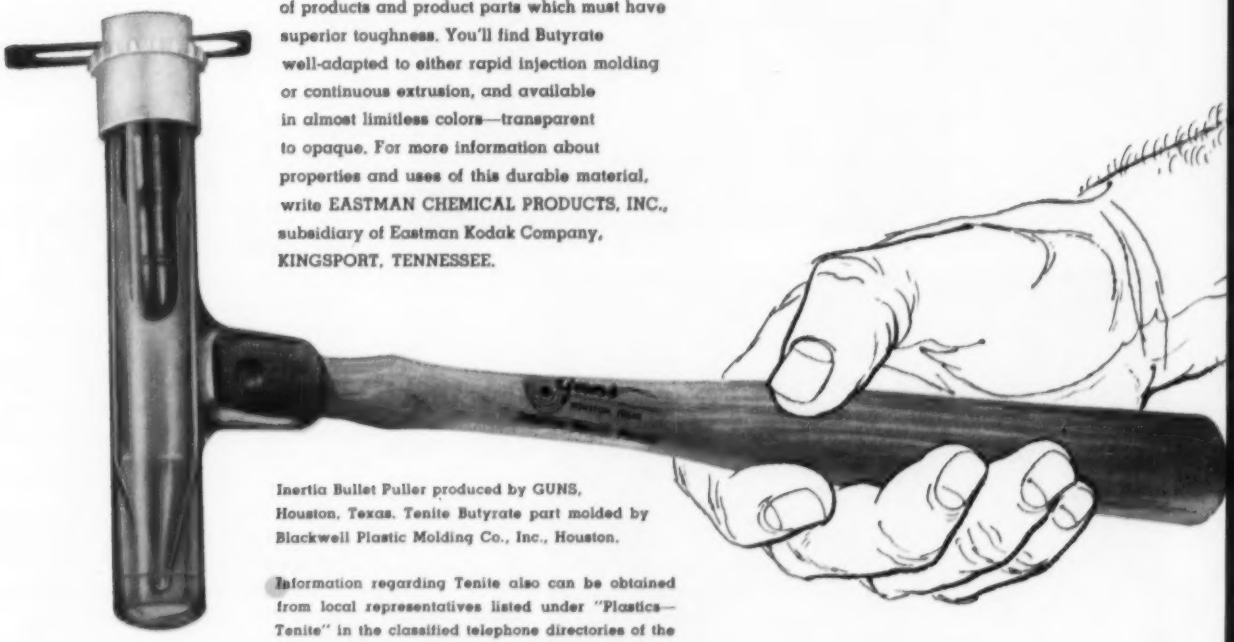
tough enough for bullet pullers



This hammerlike Bullet Puller, with a hollow head of transparent Tenite Butyrate, extracts the load from cartridges by an inertia method. Tough Butyrate takes the brunt of the operation, leaving bullet and case unmarred.

Here's how the tool works. The cartridge is placed in a separate cap, where a metal clip holds it firmly by the rim. Then the cap, with the cartridge inside, is fitted over the open end of the Butyrate hammer head. A sharp tap of the opposite end against a solid surface releases the cartridge load into the hammer interior. This quick operation neatly saves all components—case, bullet, and powder.

Tenite Butyrate is used today for hundreds of products and product parts which must have superior toughness. You'll find Butyrate well-adapted to either rapid injection molding or continuous extrusion, and available in almost limitless colors—transparent to opaque. For more information about properties and uses of this durable material, write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.



Inertia Bullet Puller produced by GUNS, Houston, Texas. Tenite Butyrate part molded by Blackwell Plastic Molding Co., Inc., Houston.

Information regarding Tenite also can be obtained from local representatives listed under "Plastics—Tenite" in the classified telephone directories of the following cities: Chicago, Cleveland, Dayton, Detroit, Houston, Leominster (Mass.), Los Angeles, New York City, Portland (Ore.), Rochester (N. Y.), St. Louis, San Francisco, and Seattle—elsewhere throughout the world, from Eastman Kodak Company affiliates and distributors.

TENITE

BUTYRATE

an Eastman plastic

Completed glass-polyester premix molding compound is removed from mixer by tilting mixer and dumping the compound into receptacle

Photos courtesy Fabricon Products, Div. of Eagle-Picher Co.

Premix molding compound is extruded into continuous rope to be made into preforms. Use of rope extrusions facilitates handling of molding compound during the actual molding

Courtesy Woodall Industries, Inc.

Automotive heater part being removed from compression press was molded in matched metal molds of fibrous glass-polyester premix material

A detailed discussion of highly filled fibrous glass-reinforced polyester molding compounds will be found on p. 133 of this issue.

blue, green, and black, reduce stability.

The usable life of the mix can be extended by storage at 45 to 50° F. When removed from a cold room, the mix should be allowed to stand at room temperature for several hours prior to use.

Presses and Pressures

Almost any standard compression molding press is satisfactory for molding polyester premix compounds. The principal feature which must be incorporated is rapid closing. From the time the mold is loaded to the application of full pressure, no more than 6 to 8 sec. should elapse; otherwise, pregel may result. It is recommended that closing speed be approximately 300 in./min. and that the daylight opening be held to the minimum necessary to service the mold. A slow-closing press can be modified with a high-volume pump to increase the speed of ram travel, and the daylight opening can often be reduced by mounting the mold on blocks. The press may be a self-contained oil hydraulic, or it may be operated off a central accumulator system provided there is a sufficient pressure reserve at all times.

Pressure requirements range from 500 to 2000 p.s.i. on the projected area of the mold. This is admittedly a wide range, but pressure requirements vary with draw, complexity of the part to be molded, and presence in the mold of core pins or other obstructions to flow. For the simplest parts involving no obstructions to flow and no more than 1 in. draw, tonnage requirements can be based upon a length-times-width calculation of the mold area perpendicular to the direction of pressure. When the draw exceeds 1 in., the following calculation is suggested:

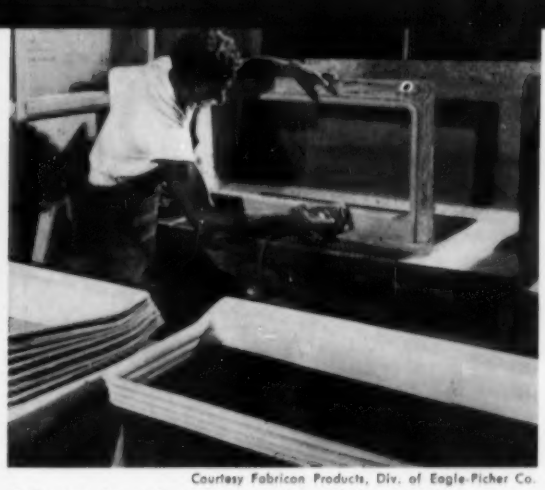
$$\text{Area} = (W \times L) + \tfrac{1}{10}(W \times L \times D)$$

where W = width in inches, L = length in inches, and D = depth in inches.

Given several arbitrary mold areas and an arbitrary line pressure of 2000 p.s.i, the tonnage required to

Courtesy Woodall Industries, Inc.

Mass-produced automobile arm rests, molded of glass-polyester premix, are placed on cooling fixture after molding to prevent warpage



Courtesy Fabricon Products, Div. of Eagle-Picher Co.

Following the cooling cycle, premix-molded automotive parts are sanded. They will next be spray-painted

produce the indicated pressure is shown in Table II.

If an existing press does not provide the necessary tonnage, it can often be modified by: 1) increasing the line pressure or, 2) increasing the ram diameter. If it is feasible to increase the ram diameter, it is probable that a higher-volume pump will be required to maintain a high closing speed.

A 100-ton press with 18- by 18-in. platens incorporating the features recommended in this article and including a self-contained oil hydraulic pumping unit, costs approximately $6000 to $8000 (as of Sept. 1955).

Molding Principles

Polyester premix compounds can be molded by compression or transfer methods. Articles manufactured by transfer molding methods do not usually develop a circular strength pattern. The resultant strength is normally of a lower order than that developed by compression methods, and shrinkage tends to be higher. The flow of material through the gate causes alignment of the fibers and produces unidirectional strength. This fact should be taken into account in the design of the mold, and the gate so designed and located as to provide maximum strength in the direction of maximum stress. Multiple gates should normally be avoided because a weak section will result at the point of knit. The best strength for the part is obtained by gating at the end of a part rather than at the center.

Owing to the abrasive characteristics of polyester premix compounds, the molds should be made of conventional mold steels hardened by heat treating. The molds should be highly polished and preferably chrome-plated to assure optimum molding conditions.

Mold Types

The type of mold depends upon the part; flash, semi-positive, and positive molds have been used successfully in premix molding. In general, semi-positive molds are recommended since the production of parts having the most uniform density and minimum shrinkage requires the material to be under positive pressure at all times. The clearance of the vertical punch entry varies somewhat with the glass content. Low-glass-content mixes which tend to be putty-like require a clearance of 0.003 to 0.004 in., whereas high-glass-content mixes require a clearance of approximately 0.006 inch. The bulk factor of premix materials also varies over a rather wide range depending upon glass content. Low-glass mixes have a bulk factor of approximately 2 to 1, whereas for high-glass mixes, it may run as high as 6 to 1. The mold should be cored for steam or cartridge type electric heaters in order to provide uniform heat transfer in both plug and cavity. It should be mounted on insulation to prevent loss of heat by radiation to the press members. Knockout pins can be satisfactorily used, but they should be somewhat larger in area than those used for other molding materials. To obtain proper material

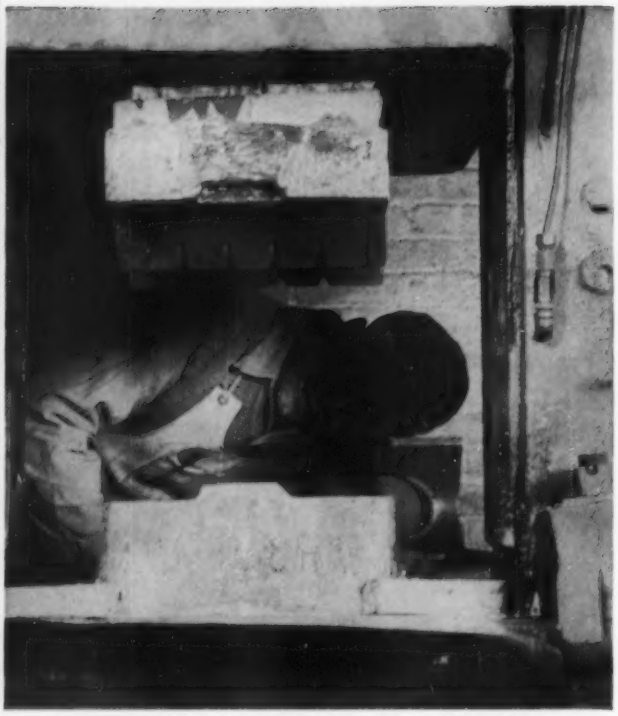
(*To page* 255)

Table III—Properties of Simple Premixes

	PE-40	PE-55
Formulation		
Resin	20	20
Glass	15	15
Ground limestone	65	65
Stearic acid	1.2	1.2
Benzoyl peroxide paste catalyst	0.8	0.4
Physical Properties		
Minimum cure at 300° F., sec. (0.060 in. thick wall)	10	10
Water absorption, 24 hr., %	0.36	0.15
Flexural strength, p.s.i., at 78° F.	9300 to 20,600	12,300 to 19,400
at 200° F.	4300 to 9400	4000 to 10,900
after 2-hr. boil	8200 to 16,100	8900 to 15,600
Modulus of elasticity in flexure p.s.i. at 78° F.	1.24 to 1.77 × 10^6	1.39 to 1.92 × 10^6
at 200° F.	0.64 to 0.75 × 10^6	0.45 to 0.57 × 10^6
after 2-hr. boil	1.01 to 1.52 × 10^6	1.12 to 1.60 × 10^6

● The punch is speedily and simply cast of Marblette resilient epoxy resin, poured over the pattern held in a plaster retaining wall.

● Time and labor savings result from using Marblette resins. No allowance for metal clearance is needed in casting. Stringent service requirements, as indicated by the deep ribbing of the part, are obtained.



● At half the cost of tools previously used by Teicher Mfg. Co., Flushing, N. Y., hundreds of sets of aircraft components are stamped out from drop-hammer punches surface-cast of Marblette epoxy resin.

Marblette Plastic Tools Cut Costs Over 50%

Dependable, quickly available plastic tools and dies are now speeding the progress of new or redesigned parts from drawing board to production run in aircraft and other industries... with Marblette epoxy and phenolic resins successfully used for tooling by East Coast Aeronautics, Cessna, Brunswick-Balke-Collender, and other leading concerns.

The economical and efficient production required for today's highly competitive conditions becomes a reality as strong and accurate tools, dies, punches, and molds are readily and conveniently cast... at substantial reductions in cost... from the versatile yet specialized resins developed by over 25 years of Marblette experience and service to industry.

EPOXY

Marblette's superior line of epoxy resins offer heightened advantages in strength, light weight, long shelf life, handling ease, dimensional stability, and lessened dermatitis risk... include potting and casting resins, laminating resins, surface coat, resins for trowelling and sealing, and general-purpose resins.

PHENOLIC

Liquid phenolic resins produced by Marblette include casting resins for tools and dies, heat and acid resistant resins, bonding resins, metal coatings, insulating varnish, bristle setting cement, laminating varnish, wood coating, plastic cements, sealing resins, foam resins and resin foundry core binders.

Marblette

37-17 Thirtieth St., Long Island City 1, N. Y.
Tel. STillwell 4-8100
CHICAGO • DETROIT • LOS ANGELES
MONTREAL • WICHITA • HAVANA

Write, phone, or wire Marblette today—for phenolic and epoxy data folders, working samples, and information on how Marblette resins will fit into your production picture.

Highly Filled Fibrous Glass-Reinforced

Polyester Molding Compound

by R. F. SHANNON† and L. P. BIEFELD†

A highly filled, fibrous glass-reinforced polyester molding compound containing 5% glass by weight has good physical properties; that is, a flexural strength of 13,000 p.s.i., and Izod edgewise impact strength of 4.5 ft.-lb./in. of notch, and a 24-hr. water absorption of 0.14 percent.

A continuous method for mixing the molding compound and a pelletizer for forming exact-weight pellets for compression molding have been developed and proven satisfactory. The highly filled, fibrous glass-reinforced polyester molding compound itself can be easily compression molded. Being white, it can be pigmented to any color desired.

The physical properties of fibrous glass-polyester molding compositions are not directly proportional to glass concentration. Compositions containing only 5% glass have physical properties very similar to compositions containing 18.5% glass. In fact, molding compound compositions containing six times as much glass have impact strengths that are only twice as high.

A detailed discussion of equipment and procedures for making and handling premixes, from the standpoint of molding plant practice, will be found on p. 125 of this issue.

THE use of fibrous glass-reinforced plastic products has become wide-spread in recent years (3, 6, 10, 14)[1] largely because they are tough, lightweight, high strength materials having excellent weathering resistance and dimensional stability superior to most metals (7, 8, 14, 15).

Prior to the development of the preform process, the application of fibrous glass-reinforced plastics was confined to rather simple shapes. The perform process, however, permitted the fabricator to produce his own reinforcing material to the desired shape and thickness of the part.

The preform process is not adaptable for molding small intricate pieces with varying thicknesses. A molding compound containing chopped glass strands and inorganic fillers is necessary for economical molding of parts of this nature. Several glass-polyester and glass-phenolic molding compounds are already commercially available while others are still in the experimental stage (1, 9, 12, 13). They all contain fairly high glass loadings and are designed primarily as shock-resistant materials. There is a need for low-cost, highly filled, fibrous glass-reinforced molding compounds that have good properties and can be easily mixed and molded.

An investigation was conducted to determine whether such fibrous glass-reinforced polyester combinations with good properties could be developed (11). One phase of this program included the evaluation of highly filled, fibrous glass-reinforced molding compounds. In conjunction with the molding compound study, the handling and processing requirements for such a material were also investigated. The fibrous glass-polyester molding compound described herein is representative of such a material. It is low in cost, has good properties, and can be pigmented to any color.

Materials

The liquid plastic chosen was a heat-convertible, unsaturated polyester[2] having a viscosity of 600 to 700 centipoises. The catalyst used was benzoyl peroxide compounded with tricresyl phosphate.[3] Precipitated zinc stearate, having a particle size of 99% through a 200-mesh sieve, served as the mold releasing agent.

The inorganic fillers used are listed in Table I. This table also in-

* Reg. U. S. Pat. Off.
† Owens-Corning Fiberglas Corp.
[1] Numbers in parentheses link to references at end of article, p. 258.

[2] Selectron 5003 as supplied by Pittsburgh Plate Glass Co.
[3] Luperco ATC as supplied by Lucidol Div. Novadel-Agene Corp.

Table I—Physical Characteristics of Inorganic Fillers

Filler	Supplier	Composition	Specific gravity	Particle size, average
Surfex	Diamond Alkali Co.	$CaCO_3$	2.65	5-10 microns
Suspenso	Diamond Alkali Co.	$CaCO_3$	2.65	5-10 microns
China clay	Witco Chemical Co.	$Al_2(SiO_3)_3$	2.6	2-5 microns
Industrial White Hydrocal	U. S. Gypsum Co.	$CaSO_4 \cdot \frac{1}{2} H_2O$	2.6	82% < 325 mesh
Portland cement	Columbia Cement Div., Pittsburgh Plate Glass Co.	—	2.9-3.2	1600 + cm^2/g.[a]

[a] Surface area

cludes the chemical composition, specific gravity, average particle size, tradename, and supplier of each filler.

Two forms of fibrous glass supplied by the Owens-Corning Fiberglas Corp. were used. Fiberglas Plastics-Reinforcing Roving was employed in the continuous mixing process, and cut Fiberglas Plastics-Reinforcing Strands were used in the batch mixing process.

The composition of the highly filled, fibrous glass-reinforced polyester molding compound can be varied without greatly affecting its physical properties. Although impact strengths increase with use of longer strands, the small gain is offset, in most cases by the poorer flow characteristics of the molding compound.

A typical formulation of the compound is as follows:

Components	*Parts*
Surfex (calcium carbonate)	62.5
China Clay (aluminum silicate)	6.2
Zinc Stearate	1.0
Selectron 5003 (polyester plastic)	24.9
Luperco ATC (benzoyl peroxide)	0.5
Fiberglas Plastics-Reinforcing Strands (½ in.-150's)	5.0

In addition to the formulation listed above, many other highly filled, fibrous glass-reinforced polyester molding compound compositions have ben formulated and evaluated. They contained a number of inert fillers, such as calcium carbonate and aluminum silicate, and also several hydraulic fillers, such as portland and gypsum cements. Table II lists a number of these molding compositions and the properties of each.

Each filler added to the molding compound formulation serves a specific purpose. Zinc stearate acts not only as a mold release, but it also tends to reduce surface tack. Small amounts of aluminum silicate filler improve the flow characteristics of the molding compound during extrusion, but tend to raise the over-all viscosity. By adding large amounts of calcium carbonate filler, a working viscosity can be maintained, and by combining small amounts of aluminum silicate filler with the calcium carbonate filler, the advantage of a workable viscosity along with good flow characteristics can be obtained.

The hydraulic fillers were incorporated in the molding compound formulation in hope of achieving higher wet strengths and better outdoor weathering resistance. Theoretically, any water absorbed by the molding compound should react immediately with the cement rather than remain as free water. Smaller losses due to moisture or outdoor weathering should result.

The shelf life of a highly filled, fibrous glass-reinforced polyester molding compound is about two to

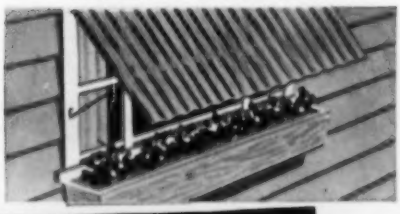
Table II—Properties of Representative Highly Filled, Fibrous Glass-Reinforced Polyester Molding Compositions

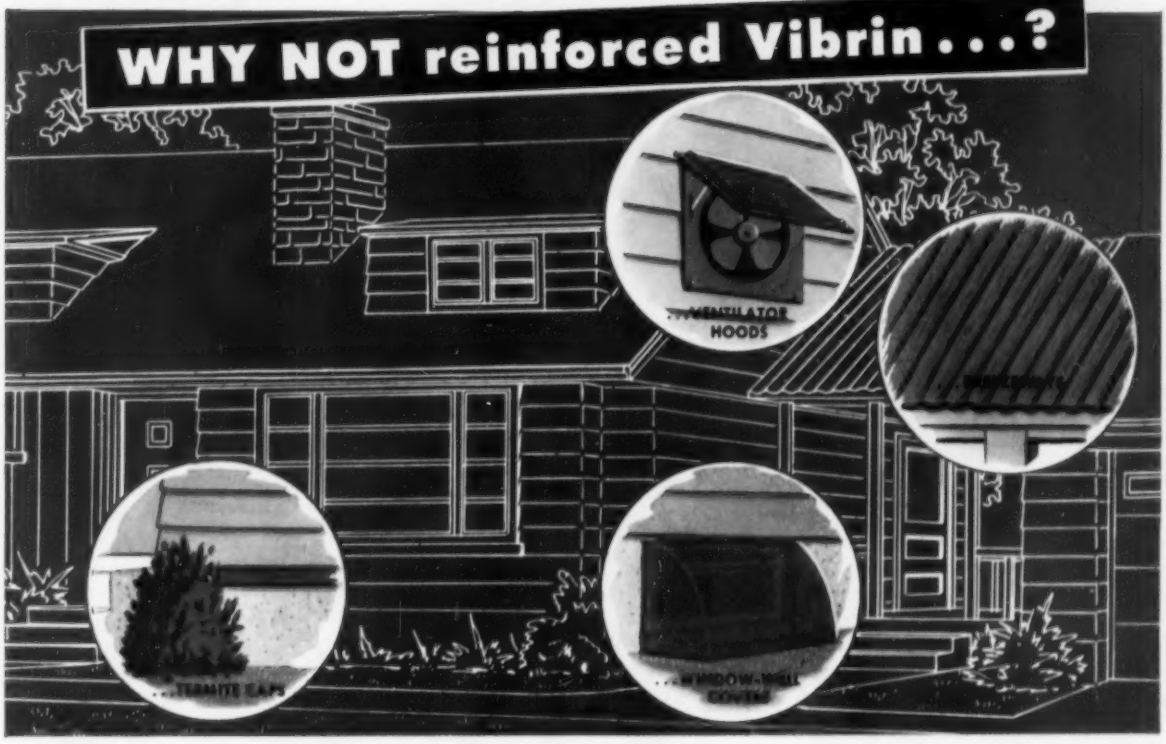
Composition		*Flexural strength, 10^3 p.s.i.*			*Izod edgewise impact strength, ft.-lb./in. of notch*	*Water absorption, % in 24 hr.*	*Specific gravity*
Material	*Parts by wt.*	*Dry*	*1 Day Wet*	*14 Days Wet*			
1. Surfex	62.5						
China clay	6.2						
Zinc stearate	1.0	13.0	14.0	13.1	4.5	0.14	2.0
Selectron 5003	24.9						
Luperco ATC	0.5						
½ in.-150's glass fibers	5.0						
2. Suspenso	75.0						
Selectron 5003	25.0	8.1	—	—	4.7	0.36	2.0
Luperco ATC	0.5						
½ in.-150's glass fibers	5.0						
3. Surfex	75.0						
Selectron 5003	25.0	11.0	11.0	9.0	4.8	0.17	2.1
Luperco ATC	0.2						
½ in.-150's glass fibers	5.0						
4. Surfex	75.0						
Selectron 5003	25.0	12.3	11.6	10.4	5.8	0.0	2.1
Luperco ATC	0.2						
1 in.-150's glass fibers	5.0						
5. Industrial White Hydrocal	75.0						
Selectron 5003	25.0	11.5	10.3	10.9	3.8	0.0	2.1
Luperco ATC	0.5						
½ in.-150's glass fibers	5.0						
6. Portland cement	71.0						
Selectron 5003	24.0	9.1	—	—	2.0	—	2.1
Luperco ATC	0.5						
½ in.-150's glass fibers	5.0						

HERE'S REINFORCED VIBRIN

- dent-proof
- rust-proof
- rot-proof
- translucent or opaque
- unbothered by weather
- resistant to abrasion
- high in impact strength
- non-splintering
- extremely light
- sound and heat insulating
- integrally colored

AWNINGS AND WINDOW BOXES





Lightweight breezeway roofs of reinforced Vibrin® can't rust, rot, or corrode. These colorful translucent panels can be made in various degrees of light transmission; for appearance sake, all panels can reflect the same degree of color.

Reinforced Vibrin termite caps will outlast the house. Easily fabricated and attached, they are not affected by moisture or the chemicals in soils and masonry. They will not harbor or support maggot or insect life. And on top of all this, reinforced Vibrin is an excellent electrical and thermal insulator.

Ventilator hoods of Vibrin will deaden sound...are not affected by oils and greases...can't absorb any cooking odors. Because they are rust- and corrosion-proof, run-off water cannot stain or discolor the siding. The color is built in. No painting is necessary.

Translucent window-well covers will allow plenty of light into the cellar. And they never need painting—playful children, sharp garden tools, and errant lawnmowers cannot scratch, scuff or even dent Vibrin.

These are just a few of the many home applications of reinforced Vibrin. So why not consider Vibrin for greenhouses, patio dividers, doors, and garden houses—wherever economy, light weight, beauty, and practicality are called for?

For resin information, expert technical assistance, or the names of current manufacturers, write to us on your company letterhead.

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

BRANCHES: Akron • Boston • Gastonia, N. C. • Chicago • Los Angeles • Memphis • New York • Philadelphia • IN CANADA: Naugatuck Chemicals, Elmira, Ontario
Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices • Cable Address: Rubexport, N. Y.

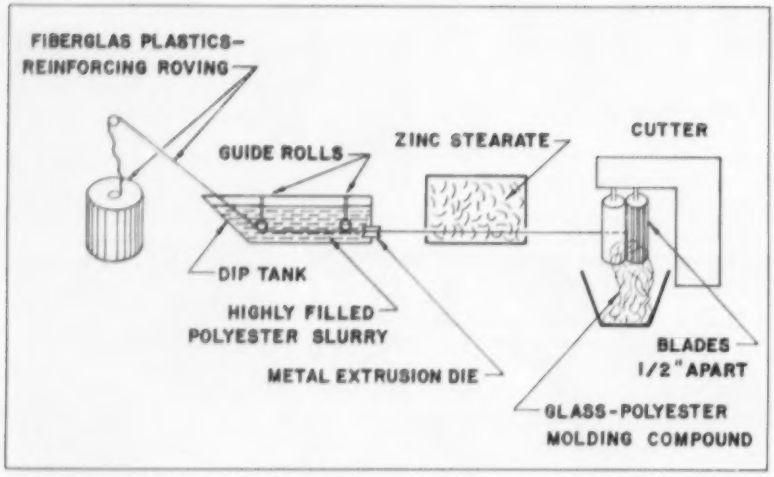


Fig. 1—Diagram of continuous mixing process for glass-polyester molding compound

three weeks if stored in a covered container at 50° F. By adjusting the catalyst content, however, all indications point toward a shelf life of at least several months.

Mixing

The first step in the preparation of a highly filled fibrous glass-reinforced polyester molding compound is to catalyze the polyester plastic. One to two percent benzoyl peroxide compounded with tricresyl phosphate based upon the weight of the plastic is used.

After the catalyst is thoroughly mixed in the plastic, a definite amount of the catalyzed plastic is weighed out and placed in a dough-type mixer. A predetermined amount of each filler is then added slowly to the catalyzed plastic being agitated in the mixing bowl. Zinc stearate is added next, followed by a mixing period of 5 to 10 min., or until all of the inorganic filler appears to be uniformly dispersed in the plastic.

The addition of fibrous glass to the above slurry, without reducing fiber length or strand integrity, is extremely difficult. Two methods have been developed; one is a batch mixing process, the other is a continuous mixing process. Both will be discussed in detail in the following sections.

Batch Mixing—Both fiber length and strand integrity affect the ultimate strength of a fibrous glass-reinforced molded part. Thus, the type of mixing action used in adding chopped strands to a highly filled plastic slurry is extremely critical. Only that type of action which does not injure or grind up the strands can be employed. Experience has shown that the kneading action of a dough-type mixer causes the least injury to the strands.

The highly filled catalyzed plastic slurry is placed in the bowl of a dough-type mixer. The cut Fiberglas Plastics-Reinforcing Strands are then sprinkled in slowly as the mix is being agitated. The mixing is continued only until all strands appear uniformly distributed throughout the mix. The mixing time at this point should be as short as possible, to prevent excessive tearing and breaking of the strands.

Continuous Mixing—Batch mixing is a slow and tedious method for incorporating glass strands into a thick, filled polyester slurry. An easier method had to be developed to make highly filled, fibrous glass-reinforced polyester molding compounds commercially feasible. The following procedure has been found satisfactory on a laboratory scale for mixing fibrous glass into a polyester molding compound on a continuous basis:

The highly filled polyester slurry is prepared as directed above with one exception, i.e., zinc stearate is not added to the slurry as in the batch process. As shown in Fig. 1, the highly filled plastic slurry is placed in a specially constructed dip tank. A number of Fiberglas Plastics-Reinforcing Rovings are drawn through this slurry and then through metal dies which control pickup. The highly filled polyester-coated rovings next pass through a chamber for surface dusting with powdered zinc stearate and then to a suitable cutter where they are cut continuously into uniform lengths.

By varying the size of the die or the number of rovings passing through each individual die, it is possible to vary the fibrous glass concentration in the molding mix. By varying the distance between the blades of the cutter, it is also possible to vary the length of the strands in the molding compound.

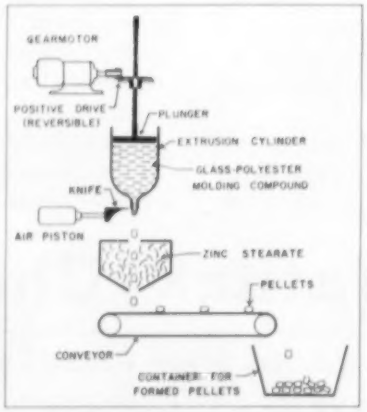


Fig. 2—Diagram of set-up for pelletizing glass-polyester molding compound

Pelletizing

Highly filled fibrous glass-reinforced polyester molding compound is a thick, stringy putty. Weighing out the exact amount necessary to fill a mold is a slow and extremely difficult process. In fact, the cost of the labor involved could counteract the advantages of low materials cost and high strengths, thereby restricting its use to only those items that can be made of no other material.

Figure 2 shows a laboratory device that forms the molding compound into exact weight pellets which can be quickly and easily placed in the mold. Briefly, the device works as follows:

The molding compound is placed in a cylinder and extruded at a constant rate, while a knife cuts it off into pellets of equal length. As the pellets are cut, they are dusted with zinc stearate, which removes all traces of surface tack.

By extruding the molding compound at a constant rate and by cutting the pellets into equal lengths, uniform-weight pellets are formed. Heavier or lighter pellets can be

Look to ENJAY for better iso-octyl and decyl alcohols for better plasticizers

Sebacates... Phthalates... Azelates... Adipates

All of these high-quality, uniform plasticizers were originally developed from Enjay iso-octyl and decyl alcohols and are conveniently available under the brands of leading plasticizer manufacturers.

More and more—superior plastics are being made with these effective and economical plasticizers.

Be sure of dependable high quality—ask *your supplier* for these plasticizers made from Enjay Alcohols. Enjay and its affiliates do not manufacture plasticizers.

ENJAY

35 successful years of leadership in serving industry

ENJAY COMPANY, INC.

15 West 51st Street, New York 19, N.Y.

ENJAY IS THE PIONEER AND THE WORLD'S LARGEST SUPPLIER OF ALCOHOLS BY THE OXO PROCESS

made by changing the cutting cycle of the knife blade. In fact, pellets of any given weight and volume can be formed by this device.

Molding

A highly filled, fibrous glass-reinforced polyester molding compound can be compression molded with ease. Experience has shown that the faster the mold is closed, the better the surfaces of the molded part. This does not mean that the mold should be slammed shut, but it should be completely closed before the compound begins to cure.

In the preparation of test specimens, a semi-positive matched metal mold was used. No pressure was exerted during the curing period since all samples were molded to stops. A pressure of 200 p.s.i. or more was used, however, to close the mold to stops. This pressure is necessary to overcome the resistance to flow offered by the molding compound itself.

A temperature of 250 to 275° F. and a time cycle of 3 to 6 min. were used to cure all of the test samples. Observations indicate, however, that the cure cycle can be reduced considerably by varying the concentration and type of catalyst.

Properties

The range of properties that can be obtained from a highly filled, fibrous glass-reinforced polyester molding compound, containing 5% fibrous glass by weight, was determined by measuring several physical properties of a number of carefully prepared test bars. Federal Specification L-P-406b (4) test methods were used to measure the physical properties: flexural strength, Method 1031; water absorption, Method 7031; impact strength, Method 1071.

Although the physical properties vary with composition, a typical highly filled, fibrous glass-reinforced polyester molding compound will have an Izod edgewise impact strength of 4.5 to 5.8 ft.-lb./in. of notch, a dry flexural strength of 11,000 to 13,000 p.s.i., a 14-day wet flexural strength of 10,000 to 13,000 p.s.i., a 24-hr. water absorption value of 0.14%, and a specific gravity of 2.0.

Table II, p. 134, lists properties of several highly filled, fibrous glass-reinforced polyester molding compositions. The first four compositions listed contain only inert calcium carbonate and aluminum silicate-type fillers. Compositions 5 and 6 contain Industrial White Hydrocal gypsum and portland-type hydraulic fillers. From the standpoint of strength, molding compositions containing hydraulic fillers are inferior to similar compositions with only inert fillers. However, glass-polyester molding compounds containing hydraulic fillers, such as portland cement, should have better long term wet strength retentions and outdoor weathering resistance. Theoretically, any water absorbed would react immediately with the cement filler rather than remain as free water. This should reduce the degree of fiber damage by the free water and should increase the total strength of the molded object, the latter resulting largely from the fact that to the original strength of the molded object would be added the extra strength of the hydrated cement.

Identical molding compounds, excepting fiber length in the glass reinforcing media, were prepared and evaluated. Molding compositions reinforced with 1 in. long glass fibers have only slightly higher flexural and impact strengths than molding compositions reinforced with ½ in. long glass fibers. Increasing the fiber length from ½ in. to 1 in. only increases the flexural and impact strengths from 11,000 p.s.i. to 12,300 p.s.i. and from 4.8 ft-lb. to 5.8 ft.-lb., respectively

Fibrous glass-reinforced polyester molding compounds containing both calcium carbonate and aluminum silicate fillers have higher strengths, especially wet flexural strengths, than similar molding compositions with only calcium carbonate fillers. A molding compound containing only calcium carbonate filler loses approximately 18% of its original strength when soaked in water for 14 days. A similar molding compound containing both calcium carbonate and aluminum silicate fillers shows no loss in strength after an equivalent period of soaking.

Table III compares the physical properties of the highly filled, fibrous glass-reinforced polyester molding compound with the published properties of glass-polyester molding formulations developed by others (2, 5). These indicate that 1) very little improvement in flexural strength is obtained by increasing the glass content above 5% by weight, 2) an increase of 600% in glass content is necessary to double the impact strength, 3) physical properties are not directly proportional to glass content, and 4) the amount of water absorbed remains constant, regardless of glass content.

Increasing the fibrous glass content of a polyester molding compound from 5% to 18.5% has no effect on the Izod edgewise impact strength. However, it does increase the flexural strength from 13,000 p.s.i. to the range of 12,000 to 17,000 p.s.i. Increasing the fibrous glass content from 5% to 30% and the cut strand length from ½ in. to ¾ in. slightly improves the properties. For instance, the impact strengths can be increased from 4.5 ft.-lb. to 10 ft.-lb. and the flexural strength from 13,000 p.s.i. to 16,000 p.s.i. Actually, from the standpoint of physical properties, it is difficult to justify the higher glass concentration since the data

(To page 258)

Table III—Effect of Fibrous Glass Concentration on Physical Properties of Glass Reinforced-Polyester Molding Compound

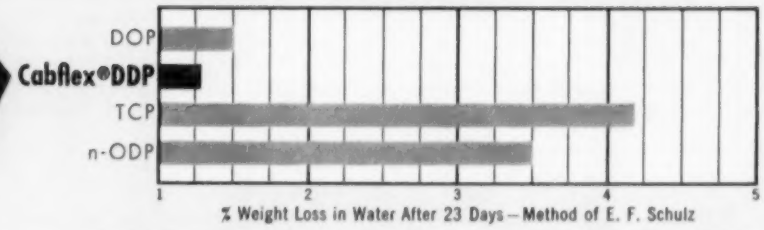
Type	Fibrous glass reinforcing media		Flexural strength	Izod edgewise impact strength	Water absorption
	Concentration	Fiber length			
	%	in.	10^3 p.s.i.	ft.-lb./in. of notch	% in 24 hr.
Highly filled, fibrous glass-reinforced polyester molding compound	5.0	½	13	4.5	0.14
General-purpose polyester-glass compound (ref. 2)	18.5	½	12-17	3.5-5.5	0.19
High-strength polyester-glass compound (ref. 5)	30.0	¾	16	10.0	—

FIRST all-decyl phthalate (introduced by Cabot in July, 1952) **STILL FIRST IN QUALITY**

Cabflex® DDP

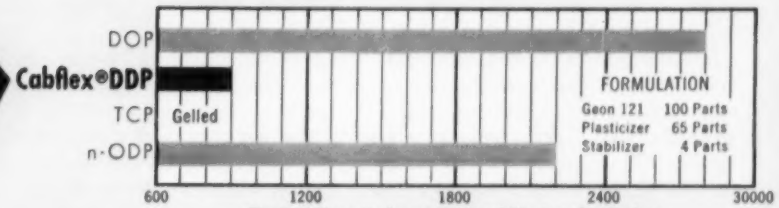
CABOT'S *di-decyl phthalate*

Lowest WATER EXTRACTION



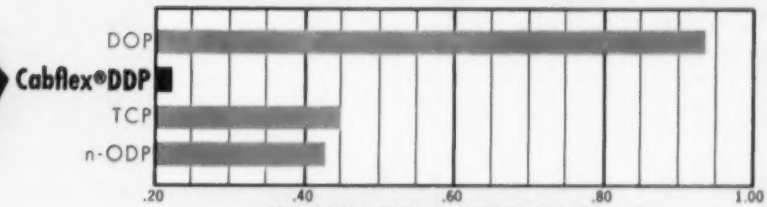
% Weight Loss in Water After 23 Days – Method of E. F. Schulz

Lowest VISCOSITY INCREASE



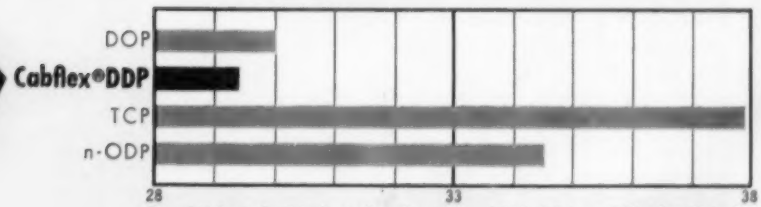
Plastisol Viscosity Increase After 4 Weeks – Centipoises

Lowest VOLATILITY



SPI Volatility – 24 Hours at 70° C – Weight Loss %

Lowest COST



Pound Volume Cost in Cents Based on Current Listed Prices of Plastics Materials

Send for samples, technical information and prices

CABOT PLASTICS CHEMICALS DIVISION

GODFREY L. CABOT, INC.
77 Franklin St., Boston 10, Mass.

CABFLEX®DI-OP (di-iso-octyl phthalate)
CABFLEX®DOP (di-2-ethylhexyl phthalate)
CABFLEX®ODP (iso-octyl decyl phthalate)
CABFLEX®DDP (di-decyl phthalate)
CABFLEX DI-OA® (di-iso-octyl adipate)
CABFLEX®DOA (di-2-ethylhexyl adipate)
CABFLEX®ODA (iso-octyl decyl adipate)
CABFLEX®DDA (di-decyl adipate)
CABFLEX®Di-OZ (di-iso-octyl azelate)
CABFLEX DI-BA®(di-iso-butyl adipate)
CABFLEX®TCP (tricresyl phosphate)

A Method for the

Interpretation of Brookfield Viscosities

by R. L. BOWLES*, R. P. DAVIE*, and W. D. TODD*

There are times when viscosity measurements are misleading and do not provide the necessary information to understand the flow behavior of fluid systems. It is the purpose of this article to point out some of the reasons why ordinary viscosity data might be ineffective and to illustrate specifically how a relatively simple viscometer can be a source of information sufficient to help solve many industrial flow problems.

No one viscometer has been developed to solve all flow problems. However, one of the most convenient and commonly used instruments, because of its ease of operation and portability, is the Brookfield Synchro-Lectric Viscometer. To make this viscometer more applicable to problems, simple "correction equations" are herein described which classify the inherent properties of a fluid system and describe its performance over a wide range of applications.

THE Brookfield viscometer, one model of which is shown in Fig. 1, measures the torque required to revolve a spindle at a number of relatively low speeds through a sample. By applying a calibration factor to the torque reading obtained directly from the dial, an apparent viscosity results. There are many reports of the use of Brookfield viscometers in various industries where the control of viscosity is important to a process or product (1-7).[1]

In Newtonian flow systems, where shearing resistance (stress) increases linearly with increasing rates of shear, viscosity is constant and a single-point Brookfield measurement is sufficient to characterize the sample's internal resistance to flow. By its very nature, any rotational viscometer, if calibrated at any particular speed, will "look at" any fluid as Newtonian if measurements are made only at that particular speed. This circumstance may give rise to considerable error in measuring non-Newtonian fluids whose viscosities are not constant but rather are dependent on the rate of shear. This is illustrated in Fig. 2. The solid line represents the true flow curve of a hypothetical sample. By definition, its "true" or plastic viscosity[2] is equivalent to its slope. A single point measurement taken at the indicated rate of shear results in an apparent viscosity (slope of the dotted line through the origin) obviously in error by the difference in slopes of the two lines. Lower rates of shear give rise to even greater error.

The flow curve of a more typical non-Newtonian sample is shown in Fig. 3. Here the same situation is present with the added feature of variable viscosity at different rates of shear. A complete flow picture of this system should provide information on the yield value,[3] Y, and the rate of change in resistance to flow with increased shear. Rate of change in resistance to flow is a measure of the magnitude of a fluid's departure from Newtonianism and can be ascribed to factors such as: 1) the nature and uniformity of the particle size of the ingredients (dispersions); 2) how these particles pack in the mixture (dispersions); 3) the amount of dispersion liquid and the extent of voids created when the system is disturbed (dispersions); and 4) the ease of alignment of long chain molecules (solutions).

It is easily seen that one-point measurements (as in Fig. 3) with

Fig. 1—Model of Brookfield viscometer

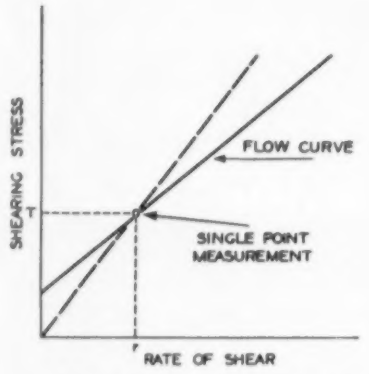


Fig. 2—Apparent flow curve for a hypothetical non-Newtonian fluid, as resulting from a single-point viscosity measurement, and true flow curve

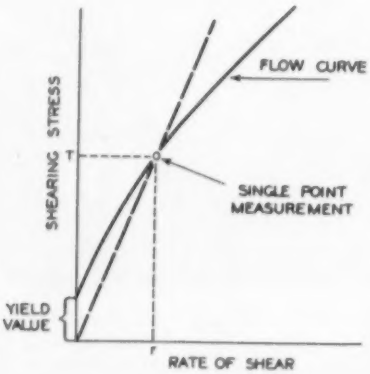


Fig. 3—Apparent and true flow curves of non-Newtonian sample with variable viscosity at different shear rates

*B. F. Goodrich Chemical Co.

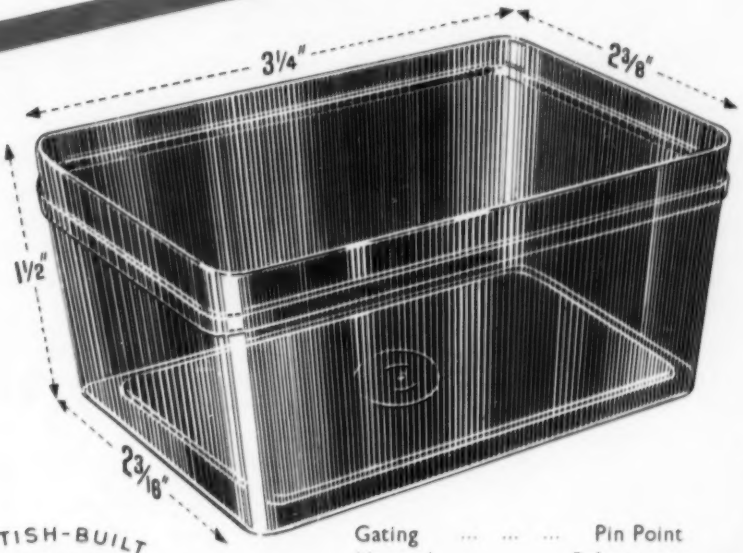
[1] Numbers in parentheses link to references at end of article, p. 148.

[2] Plastic viscosity has been defined as the shearing stress in excess of yield value that will induce a unit rate of shear.

[3] The force in dynes/cm.² required to initiate flow.

600 Shots an Hour!

FULLY AUTOMATIC



Gating	Pin Point
Material	Polystyrene
Weight	14 Grammes

BRITISH-BUILT

DOWDING

NEW SERIES II AUTOMATIC

INJECTION MOLDING MACHINE

30-GRAMME CAPACITY

Send for details of this NEW MACHINE

AVAILABLE FOR EARLY DELIVERY

DOWDING & DOLL LTD

346 KENSINGTON HIGH STREET · LONDON · ENGLAND

Cables: ACCURATOOL HAMMER LONDON

88A

Table I—Brookfield Flow Equations*

RVF (2,4,10,20 r.p.m.)	LVF (6,12,30 and 60 r.p.m.)	HBT (3,6,15,30,60,120,300,600 r.p.m.)
$Y = 4\,(V'_2 - V'_4)/100$	$Y = 12\,(V'_6 - V'_{12})/100$	$Y = 6\,(V'_3 - V'_6)/100$
$V_3 = 2V'_4 - V'_2$	$V_9 = 2V'_{12} - V'_6$	$V_{4.5} = 2V'_6 - V'_3$
$V_7 = (5V'_{10} - 2V'_4)/3$	$V_{21} = (5V'_{30} - 2V'_{12})/3$	$V_{10.5} = (5V'_{15} - 2V'_6)/3$
$V_{15} = 2V'_{20} - V'_{10}$	$V_{45} = 2V'_{60} - V'_{30}$	$V_{22.5} = 2V'_{30} - V'_{15}$
		$V_{45} = 2V'_{60} - V'_{30}$
		$V_{90} = 2V'_{120} - V'_{60}$
		$V_{210} = (5V'_{300} - 2V'_{120})/3$
		$V_{450} = 2V'_{600} - V'_{300}$

*The V primes (V') refer to apparent viscosities calculated in the usual fashion, the subscripts to r.p.m. and the V's to corrected viscosities. For example, V'$_4$ = apparent viscosity at 4 r.p.m. and V$_4$ = corrected viscosity in the region between 2 and 4 r.p.m.

the Brookfield viscometer, or any other instrument for that matter, are unsatisfactory because they do not describe the flow behavior at varying rates of shear and they do not sufficiently characterize the physical structure.

Equations for Brookfield Viscometers

Most of the writers' experiences with non-Newtonian flow systems has been in the study of vinyl paste resin dispersions, the control of their viscosity characteristics, and the formulation of compounds with certain flow properties designed to meet specific applications (8). The instrument that proved highly successful in this work was the Interchemical Precision Rotational Viscometer (9). Other viscometers that have been used are the McMichael (10) and the Severs Extrusion Rheometer (11). For reasons of utility, however, the Brookfield is the most common viscometer in this field and, unfortunately, one-point readings are most often employed as the criteria of viscosity. This leads to poor (or no) correlation with the flow curves produced by the above instruments as well as frustration in trying to deal intelligently with flow properties. Equations will be described that were developed over two years ago in order to overcome these difficulties and to make the Brookfield a more informative instrument. They have been found to be very helpful and to have application also to non-Newtonian high polymer solutions.

A list of "correction" equations for three Brookfield models, RVF, LVF, and HBT, are given in Table I.

The formulae in Table I are based on the following analysis. Brookfield apparent viscosities are slopes connecting the true flow curve with the origin such as in Fig. 4. With knowledge of these slopes, the slope of the actual flow curve in this rate of shear region can be obtained by simple algebra. This same line of attack also enables one to determine where the flow curve intersects the shear stress axis (i.e., to estimate the yield value).

Specifically, the steps in the analysis are as follows: The apparent viscosities, V'_1 and V'_2 are observed at rates of shear, r_1 and r_2. V'_1 and V'_2 are slopes of the line drawn through the origin and points (T_1, r_1) and (T_2, r_2), respectively, where T_1 and T_2 are the stresses required to rotate the spindle at speeds r_1 and r_2 through the sample. This information is graphed in Fig. 4. From the actual flow curve (solid line) the following are desired: 1) the slope, V, which is the plastic viscosity and 2) the intercept, Y, on the T-axis which estimates the yield value of the system. The Brookfield viscometer has provided two apparent viscosities or slopes from the flow curve to the origin. However, these suffice to approximate the true slope of the flow curve in this region and, assuming linearity, the intercept on the T-axis or yield value.

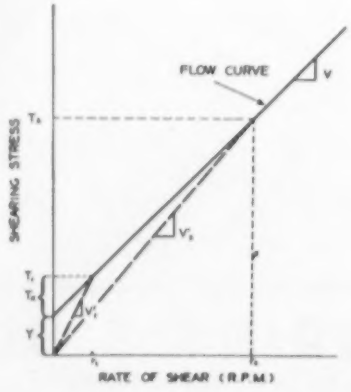


Fig. 4—Model for graphical derivation of equations for determination of true flow and estimation of yield values

The solution for the plastic viscosity, V, is as follows:

$$T_1 = kr_1 \times V'_1 \qquad \text{Eq. 1}$$

where k = proportionality factor between r.p.m. and inverse seconds for a given spindle.

$$T_2 = kr_2 \times V'_2 \qquad \text{Eq. 2}$$

and

$$V\,(\text{slope of curve}) = \frac{T_2 - T_1}{k\,(r_2 - r_1)} \qquad \text{Eq. 3}$$

Substituting Eq. 1 and 2 in Eq. 3,

$$V = \frac{r_2 V'_2 - r_1 V'_1}{r_2 - r_1} \qquad \text{Eq. 4}$$

If $r_2 = cr_1$, where c = proportionality factor between r_2 and r_1, i.e., $r_2/r_1 = c$,

$$V = \frac{cV'_2 - V'_1}{c - 1} \qquad \text{Eq. 5}$$

For most Brookfield speed increments, c = 2, and hence

$$V = 2V'_2 - V'_1 \qquad \text{Eq. 6}$$

For the yield value, Y,

$$Y = T_1 - T_X \qquad \text{Eq. 7}$$

where

$T_X = r_1 V$. Hence

$Y = r_1 V'_1 - r_1 V$

$= r_1 V'_1 - r_1 (2V'_2 - V'_1)$, if c = 2

$= 2r_1 (V'_1 - V'_2)$

$Y\,(\text{dynes/cm.}^2) = 2r_1 (V'_1 - V'_2)/100$ Eq. 8

Division by 100 required to convert to dynes/cm.^{2}.

Experimental Results

The applications and advantages of these equations will now be demonstrated by results obtained with the formulations in Table II, p. 144. The plastisols listed under "A" were compounded such that the plastic viscosity remained relatively constant but the yield value varied over a wide range. Those plastisols listed under "B" were compounded such that the degree of non-Newtonianism (dilatancy) and plastic viscosity varied over a wide range. The polymer solutions listed under "C" represent different samples of polymer X which were quite different in processability.

Controlled conditions were used for sample preparation, sample aging, temperatures during aging,

At Last!

a plastic aerosol container

...styled for sales, designed for production

NOW, for the first time, toiletries producers can use a container that combines the advantages of aerosol packaging with the beauty of *quality* plastic—Cyanamid's Melamine Molding Compound 1077. This is the first spray dispenser that looks just as attractive as the other toiletries women are used to—and look for.

Here, then, is a completely new packaging opportunity with terrific sales potential. It offers exceptional design possibilities in an unlimited range of lustrous colors. The spray package is rigid, break resistant, corrosion resistant, light, convenient to fill and ship. Simple construction makes assembly fast and easy. Container, closure and collet are all molded of Melamine Molding Compound 1077. A stainless steel spring activating the collet is the *only* non-plastic component!

We will be glad to help you apply these advantages to *your* packaging problem. Write today for complete data, or ask to have a Cyanamid Technical Representative call.

Molded of Cyanamid's Melamine Molding Compound 1077 by Colt's Manufacturing Company, Hartford, Conn.

AMERICAN Cyanamid COMPANY

PLASTICS AND RESINS DIVISION

32 Rockefeller Plaza, New York 20, N. Y.

In Canada: North American Cyanamid Limited, Toronto and Montreal

Table II—Compositions Investigated

	(1)	(2)	(3)	(4)	(5)	(6)
A. Variation in Yield Stress						
Geon 121	100	100	100	100	100	100
Goodrite GP-261	80	75.3	70.6	67.15	63.7	61.2
Supermultifex (45% in GP-261)	—	22.2	44.4	55.0	66.6	88.8

	(0)	(1)	(2)	(3)	(4)	(5)	(6)
B. Variation in Dilatancy							
Geon 121	100	100	100	100	100	100	100
Goodrite GP-261	45	55	65	75	85	95	105

	(1)	(2)	(3)	(4)	(5)	(6)
C. Variation in Pseudoplasticity						
Polymer X	8.9*	8.9*	8.9*	8.9*	8.9*	8.9*
H_2SO_4 (98%)	0.1	0.1	0.1	0.1	0.1	0.1
Dimethyl Formamide	50.0	50.0	50.0	50.0	50.0	50.0

*Variable samples

viscosity measurement, and shearing histories. Complete flow curves of all the above samples were obtained using the Precision Interchemical Rotational Viscometer (IRV) as well as the above mentioned Brookfield viscometers. Yield values and plastic viscosities were calculated from these IRV curves according to normal practice (8). These were then plotted versus the Brookfield values with and without the use of the proposed equations.

Series A—For example, Sample #3 in Table II of the "A" series gave the results shown in Table III.

Figures 5, 6, and 7[4] illustrate two desirable features of the proposed equations: 1) that the corrected viscosities correlate well with the plastic viscosity as measured by the IRV and 2) that they provide a useful determination of the yield value.

These six samples had IRV viscosities that varied over a 70% range. The degree to which the IRV and uncorrected Brookfield viscosities correlated (Fig. 5) was such that it would require a 47% viscosity difference between the samples before the two viscometers could be expected to agree in determining which of the samples was the more viscous. However, the correlation between the IRV and corrected Brookfield viscosities (Fig. 6) is sufficient that a 10% sample viscosity difference can be agreed upon by the two viscometers. Thus these equations not only permit improved viscosity and yield value correlation but also better approximate the IRV viscosity in absolute values. It will be noticed that as the ratio of viscosity/yield value decreases, the need for using the proposed equations increases. Likewise as the samples become more non-Newtonian, the proposed equations reveal additional information.

Series B—The results of the "B" series with different resin/plasticizer ratios are shown in Figs. 8 to 11 inclusive. Again a significant increase resulted in the degree to which the viscometers correlated.

These compounds demonstrate measurable degrees of non-Newtonian behavior which may be estimated by the ratio of Utan 100/U200 from the IRV results and by V_{450}/V_{210} from the Brookfield. Good viscometer correlation resulted (Fig. 12).

Series C—The six polymers investigated in series "C" differed widely not only in viscosity but also in the degree to which viscosity decreased with increased shear. Utilization of the Brookfield correction equations improved the agreement between the two viscometers (Figs. 13 to 15, inclusive).[5]

Being able to express objectively the degree of non-Newtonianism is as important in many applications as the plastic viscosity per se, and comparing ratios of corrected Brookfield viscosities is a convenient means of determining this important physical property.

Scope and Principles

The correction equations for the Brookfield viscometer have been demonstrated. Their use in determining the presence of a yield value and in estimating the plastic viscosity in systems where yield is significant has been shown. But they are not limited to these systems alone. They can indicate in the shearing range investigated, if a sys-

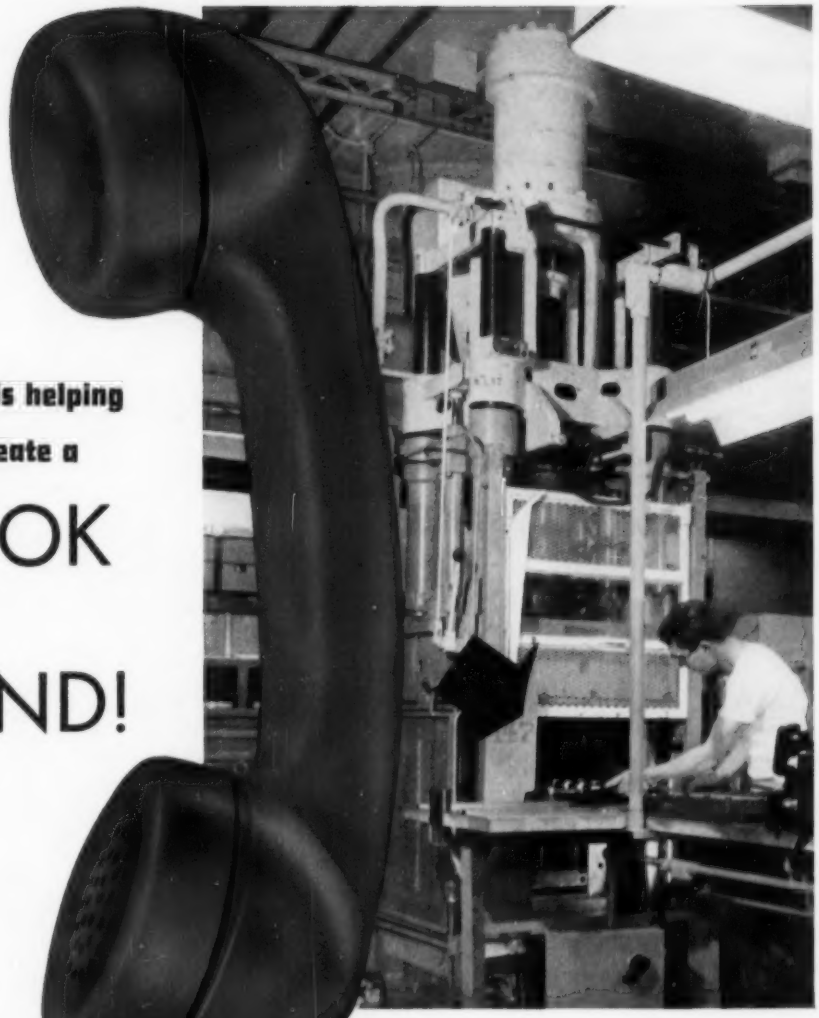
[4] Figures 5, 6, 7, 8, 9, and 10 appear on p. 146; Figs. 11, 12, 13, 14, and 15 appear on p. 148.

[5] Note that the Brookfield ratios in Figs. 12 and 15 differ. In the former, the corrected viscosities V_{450} and V_{210} were chosen in order to reduce as much as possible the effect of yield value variations. However, in the pseudoplastic systems of Fig. 15 where very little yield was present, V_{450} and $V_{4.5}$ were selected to secure the widest possible range in shear rates.

Table III—Experimental Results for Sample A(3)

Brookfield HBT			Precision Interchemical		
Measured value		Calculated value*		Up curve	Down curve
cp.		cp.		cp.	cp.
V'_2 53400		$V_{4.5}$ 13100			
V'_6 32250		$V_{10.5}$ 8900			
V'_{15} 18650		$V_{22.5}$ 8000	U200	4700	2900
V'_{30} 13350		V_{45} 5150			
V'_{60} 9300		V_{90} 4700			
V'_{120} 7000		V_{210} 4200			
V'_{300} 5300		V_{450} 3300	Utan 100	3000	2900
V'_{600} 4300		Y 1200 d/cm.²	f200	400 d/cm.²	550 d/cm.²

*The calculated values are found by substituting in the equations of Table I. For example:
$Y = 6\ (V'_2 - V'_6)/100 = 6\ (53400 - 32250)/100 = 1200$ dynes/cm.²
$V_{4.5} = 2V'_2 - V'_6 = 2\ (32250) - 53400 = 13100$ cp.



How WATSON-STILLMAN is helping

WESTERN ELECTRIC create a

NEW LOOK for an OLD FRIEND!

Hardly recognize this old friend, would you? It's only *one* of the *eight* full-color telephones Western Electric is now making for Bell Telephone users! The new gray, yellow, beige, ivory, blue, green, brown or red telephones are designed to blend with the decor of your home or office. All eight colors also come in two-tone combinations—a lustrous colored base with a jet black handset.

Many of the handsets for these handsome "new look" telephones will be molded on 20-Oz. Watson-Stillman Vertical Injection Molding Machines. Eight have been ordered; several already are in operation (see above) in Western Electric's Indianapolis plant.

These W-S Vertical Injection Molding Machines have a "new look" all their own. Available in 16, 20 and 24-Oz. capacities, they are designed and built to meet your demand for a machine that provides low-cost, high-speed production. And just check this list of features!

- *pre-positioning of injection plunger*
- *internally heated cylinder*
- *controls conveniently located*
- *large die space*
- *inter-locked safety guard on all sides*
- *center hydraulic stripping*
- *full hydraulic clamp*
- *oilgear pumping and control system*

Why not write today for complete information on these new Watson-Stillman Vertical machines? Watson-Stillman also makes a complete line of injection, compression and transfer molding machinery in a wide range of models to fit your job—production-wise and economy-wise.

A DIVISION OF HKP H. K. PORTER COMPANY, INC.

THE WATSON-STILLMAN COMPANY

DIVISION OF H. K. PORTER COMPANY, INC.
150 Aldene Road, Roselle, N. J.
European Subsidiary: WATSON-STILLMAN INTERNATIONALE
Maatschappij N. V.
Groothandelsgebouw — Rotterdam — Holland

W-S HYDRAULIC ESTABLISHED 1848

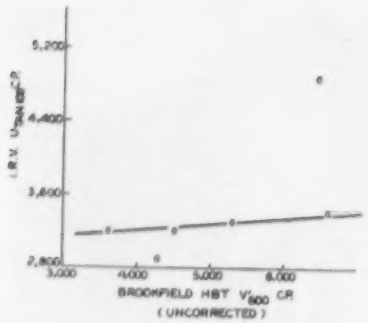


Fig. 5—Correlation between high-shear viscosity measurements using IRV and Brookfield instruments, uncorrected. (Based on series A, Table II, p. 144)

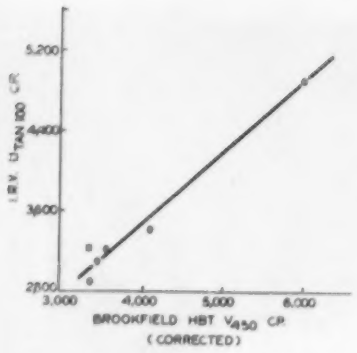


Fig. 6—Correlation between IRV and corrected Brookfield high-shear viscosity readings. (Series A, Table II)

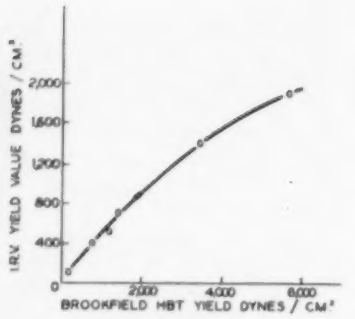


Fig. 7—Yield value correlation between measurements taken with the IRV and the Brookfield viscometer. (Based on series A, Table II, p. 144)

tem is Newtonian[6] or non-Newtonian; and if non-Newtonian, they provide an estimate of the degree of departure from Newtonianism. This is accomplished simply by not assuming all systems to have Newtonian flow as do uncorrected one-point Brookfield viscosity measurements.

Successful application of these equations to compounding problems requires an appreciation of non-Newtonian flow. The experimenter must be acquainted with the flow patterns of yield value, dilatant, and pseudoplastic systems and the meaning of the flow curve itself. Certain other principles should also be recognized:

1. No one viscometer can measure over an infinitely wide range of shearing rates and hence cannot completely describe the flow characteristics of a non-Newtonian.

[6] In which case, the corrected value is the same as the measured value.

While the IRV and the Brookfield viscometers are both rotational type viscometers, there is a wide difference in the rates of shear developed. This is the reason why corrected Brookfield viscosities cannot be expected to agree absolutely with IRV viscosities.

2. Fortunately, for application work, a complete description of the flow properties of a non-Newtonian under all conditions is seldom necessary. What is important to know is the behavior in the range of shearing rates where its flow properties are critical for successful application. Even if the shearing rate of the application cannot be defined, it is usually known to be relatively high or low, and often an estimate can be made.

3. The understanding and prediction of non-Newtonian flow properties in any application demand a careful consideration of the sample history, the measuring conditions, and the application requirements. It is especially important for comparisons of flow properties to treat all samples alike in every particular.

4. In compounding for a specific application, it is highly desirable to have a sample of material that is known from previous experience to have satisfactory flow properties. Then, if the properly determined viscosity characteristics can be matched, it is almost certain that the developed sample will perform equally well.

Applications

A few cases will serve to show where the correction equations for the Brookfield viscometer can be of service. So called non-drip plastisols (plastigels) are often used as protective and decorative coatings for various objects. The object, such as a wire basket, is dipped into the plastisol and slowly withdrawn. The coating must not sag or drip. The

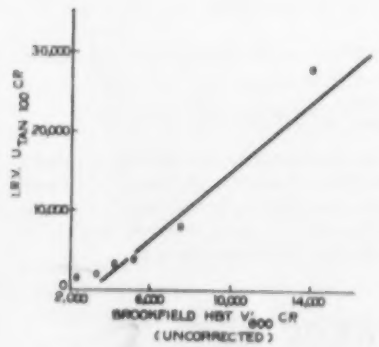


Fig. 8—Correlation between high-shear viscosity measurements using IRV and Brookfield instruments, uncorrected. (Based on series B, Table II, p. 144)

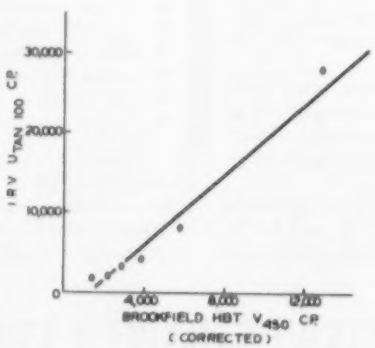


Fig. 9—Correlation between high-shear viscosity measurements using IRV and Brookfield instruments, corrected. (Based on series B, Table II, p. 144)

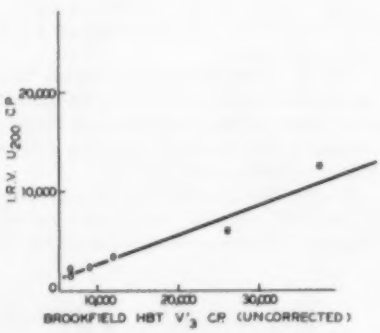
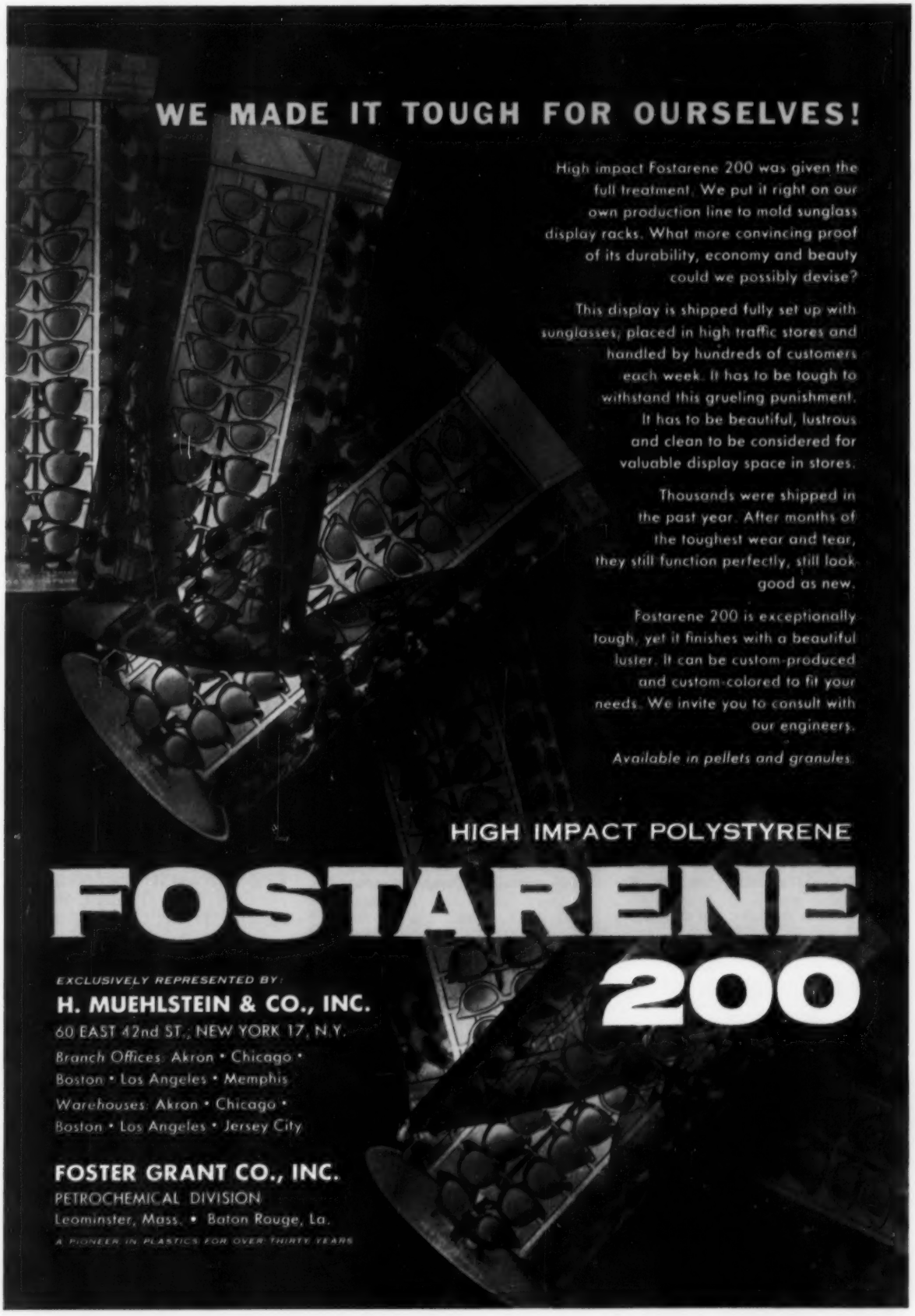


Fig. 10—Low-shear viscosity correlation between IRV and uncorrected Brookfield viscometer measurements. (Based on series B, Table II, p. 144)


WE MADE IT TOUGH FOR OURSELVES!
High impact Fostarene 200 was given the full treatment. We put it right on our own production line to mold sunglass display racks. What more convincing proof of its durability, economy and beauty could we possibly devise?
This display is shipped fully set up with sunglasses, placed in high traffic stores and handled by hundreds of customers each week. It has to be tough to withstand this grueling punishment. It has to be beautiful, lustrous and clean to be considered for valuable display space in stores.
Thousands were shipped in the past year. After months of the toughest wear and tear, they still function perfectly, still look good as new.
Fostarene 200 is exceptionally tough, yet it finishes with a beautiful luster. It can be custom-produced and custom-colored to fit your needs. We invite you to consult with our engineers.
Available in pellets and granules.
HIGH IMPACT POLYSTYRENE
FOSTARENE 200
EXCLUSIVELY REPRESENTED BY:
H. MUEHLSTEIN & CO., INC.
60 EAST 42nd ST., NEW YORK 17, N.Y.
Branch Offices: Akron • Chicago • Boston • Los Angeles • Memphis
Warehouses: Akron • Chicago • Boston • Los Angeles • Jersey City
FOSTER GRANT CO., INC.
PETROCHEMICAL DIVISION
Leominster, Mass. • Baton Rouge, La.
A PIONEER IN PLASTICS FOR OVER THIRTY YEARS

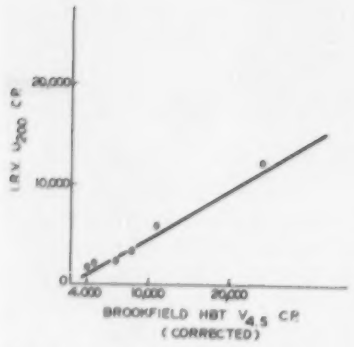


Fig. 11—Low-shear viscosity correlation (IRV and corrected Brookfield; based on series B, Table II, p. 144)

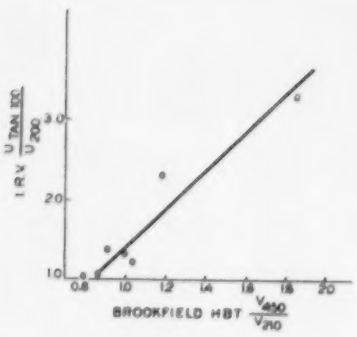


Fig. 12—High-to-low shear viscosity ratio correlation IRV and Brookfield (Based on series B, Table II, p. 144)

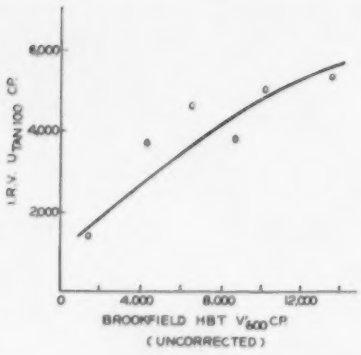


Fig. 13—Correlation between IRV and uncorrected Brookfield viscosities. (Based on series C, Table II, p. 144)

Brookfield and IRV characteristics of such a plastisol are as follows:

Brookfield (downcurve)	IRV (downcurve)
$V_0 = 4000$ cp.	U200 = 1200 cp.
$V_{60} = 2700$ cp.	Utan 100 = 1200 cp.
Y = 1320 dynes/cm.^{2}	f200 = 370 dynes/cm.^{2}

It will be noticed that the numerical ratio of the plastic viscosity at low shear to the yield value in each case is approximately three to one. Without the correction equations, one cannot evaluate the ratio from ordinary Brookfield readings.

Cavity molding, or the plastisol casting of solid articles, is another low-shear application where a low to medium plastic viscosity is indicated. In contrast to the above dipping operation, a very low order of yield is desirable to insure faithful mold reproduction. It is difficult to generalize in the case of slush and rotational molding because of the many other factors which can influence results. The magnitude of the yield value, however, plays a part in such things as evenness of coating and the amount of flash produced. The correction equations allow measuring the yield and controlling the flow properties.

A high rate of shear is usually involved in spread coating. Where the substrate is porous, penetration is largely controlled by the yield value. Again, this can be evaluated with the correction equations. Where problems of dilatancy are concerned with resultant knife "spitting," the Brookfield viscometer is admittedly not the most suitable instrument to use because of its low rate of shear compared to the IRV or the Severs. On the other hand, one can determine a measure of the degree of dilatancy in very dilatant systems by means of the correction equations.

As a last example, the flow properties of a totally different system may be cited: Yield value of a freshly sheared vinyl latex paint had to be no greater than 120 dynes/cm.^{2} to achieve good leveling and that, at this value, sag was not a problem. The work on these pseudoplastic systems was done entirely with a Brookfield RVF Viscometer (12).

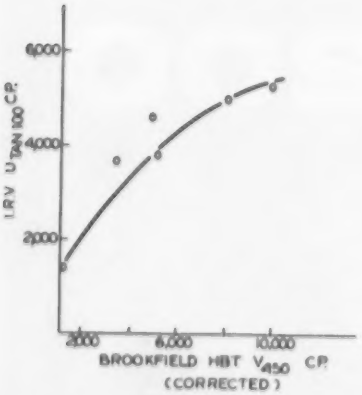


Fig. 14—Correlation between IRV and corrected Brookfield viscosities. (Based on series C, Table II, p. 144)

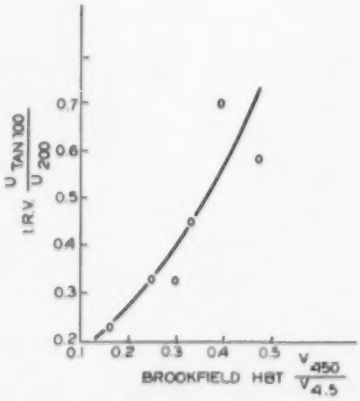
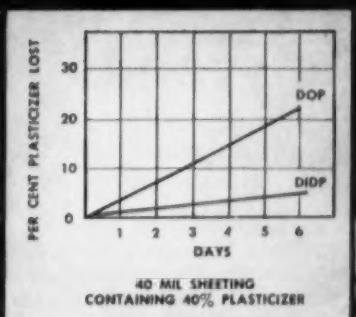


Fig. 15—High-to-low shear viscosity ratio correlation (IRV and Brookfield; based on series C, Table II, p. 144)

References

1. "Measurement of Enamel-Slip Consistency by Means of the Brookfield Viscometer," by E. M. Oliver, J. Am. Ceram. Soc. *31*, 5, 128 ('48).
2. "The Rheology of Paper Coatings," by W. R. Willets, Tech. Assoc. Pulp Paper Ind. *33*, No. 4, 201 (1950).
3. "The Rheology of Rubber Solutions and Suspensions," by L. Leaman, Rubber Age *69*, 6, 699 ('51).
4. "Comparative Viscosities of Coconut Oil Liquid Soaps," by R. B. Trusler, J. Am. Oil Chemists' Soc. *30*, No. 3, 100 (1953).
5. "The Manufacture of Cooked Confection and Its Practical Significance," by A. R. Gudheim, M. Confectioner, *34*, No. 12, 29 (1954).
6. "Quick Dry Inks and Ball Point Pens," by D. E. Gould, Am. Ink Maker *32*, No. 3, 38 (1954).
7. "Continuous Measurement of Ketchup Viscosity in the Finishing Kettles," by L. M. Richardson, Instruments 7, No. 12, 27 (1954).
8. W. D. Todd, Official Dig., Federation Paint & Varnish Production Clubs, No. 325, 98 (1952).
9. Precision Scientific Co.
10. G. M. Powell, R. W. Quarles, C. I. Spessard, W. H. McKnight, and T. E. Mullen, Modern Plastics *28*, 129 (June 1951).
11. E. T. Severs and J. M. Austin, Ind. Eng. Chem. *46*, 2369 (1954).
12. Unpublished report, B. F. Goodrich Chemical Co.—End

SUPERIOR VISCOSITY STABILITY OF DIDP (right) vs. DOP after one-week storage at 50° C. DIDA and DIDP also give plastisols low *initial* viscosity. All decyl plasticizers are superior to comparable octyl esters in this characteristic.



LOW VOLATILITY OF DIDP—An important factor affecting the permanence of a plasticizer. Plasticized properties are retained even after severe heat aging. All decyl plasticizers are superior to comparable octyl esters in this characteristic.

LOW SOAPY-WATER EXTRACTION. DIDP keeps products soft, manageable, after many washings. After 24 hours at 50°C. in a 1% soap solution, 2.0% DOP is extracted, only 0.5% DIDP. All decyl plasticizers are superior to comparable octyl esters in this characteristic.

Boost profits . . . broaden your line with Monsanto's five decyl plasticizers

S-606

(*mixed phthalate*)

Santicizer 606 offers optimum processing characteristics, alkali and grease resistance and flexibility at the lowest pound-volume cost. Specially suited for vinyl floor tile.

S-603

(*butyl decyl phthalate*)

Santicizer 603, a low pound-volume cost plasticizer. Offers good flexibility, good color, low specific gravity, fusion characteristics similar to DOP. Used in film, sheeting, extrusions and plastisols.

DIDA

Offers excellent low-temperature flex and lower volatility than DOA or DOP. High tensile strength, good heat and light stability, excellent moisture resistance. Used in garden hose, free film and sheeting, coated fabrics.

DIDP

Low volatility, excellent retention of properties after severe heat aging, good electrical properties, superior plastisol viscosity stability. Excellent resistance to extraction by soapy water. Used for thin films, upholstery materials, wire compounds, plastisols, floor tile.

S-602

(*iso octyl iso decyl phthalate*)

Santicizer 602 offers good softening efficiency and resistance to soapy-water extraction, high alkali resistance, lower volatility than DOP or DIOP (other properties comparable). Used for floor tile, plastisols, film, sheeting, coated fabrics.

FOR TECHNICAL BULLETINS AND DATA SHEETS on DIDA, DIDP, S-602, S-603, S-606, write: Organic Chemicals Division, Monsanto Chemical Company, Box 478-M-4, St. Louis, Missouri.

MONSANTO
CHEMICALS—PLASTICS

SERVING INDUSTRY WHICH SERVES MANKIND

Santicizer Reg. U. S. Pat. Off.

Methods of Testing

Modified Polystyrenes

for Use in Telephone Housings

by HILDING HOGBERG*

Four different types of styrene polymers were investigated for impact strength according to a special method. The strength of weld lines was determined. Water absorption, scratch resistance, and insulation properties were measured. A comparison of the different materials is given. Some of the requirements for plastics suitable for molding telephone housings are discussed.

THE new types of polystyrenes have improved impact resistance, relatively low price, moldability, dimensional stability, and high insulating properties. They are, therefore, becoming attractive materials for molders of telephone equipment, e.g., telephone housings, hand pieces, and the like. But materials used for these purposes must fulfill many other requirements as well. The material must be scratch-resistant, must be proof against perspiration, and must maintain gloss and color during many years of use. It is desired that a telephone set shall function for at least 25 years. Thus, aging properties are of great importance, and careful consideration must be given to the choice of material.

Impact Testing

Many different methods have been developed for the testing of impact resistance of thermoplastics. Most of them make use of injection molded test bars. This method of testing a thermoplastic material, however, depends on many factors such as the manner of molding the test bars, mold design, molding conditions, etc. National standards often use test specimens of different sizes and the results are, therefore, not comparable. It is obvious that international testing methods would be of great advantage to the industry when comparing data sheets of materials originating from different countries.

Most national standards for impact testing have the disadvantage that the anisotropy of a molded test bar has been overlooked, so that the results are often not in accordance with experience of the behavior of molded articles when exposed to forces such as bending and shock. This is true of many thermoplastics with chain molecules such as polystyrenes and its copolymers.

To obtain a better understanding of the mechanical properties of thermoplastics, a new testing method has been developed by the Plastics Laboratory of L. M. Ericsson. It is thought that this method will give designers more reliable figures when planning a new constructional part.

By this method a flat disk (thickness 3 mm., diameter 100 mm.) is injection molded with a pinpoint gate (diameter 1.2 mm.) located on the flat surface of the mold and 5 mm. from the periphery of the disk. Test bars (width 10 mm., thickness same as disk, length same as diameter of disk) are machined from the molded disks in the direction of flow and perpendicular to flow.

In order to determine the strength of *weld lines*, which is very important from a practical point of view, disks were also injection molded in another mold. This was furnished with two pinpoint gates of similar size to that mentioned above. They were located on a diameter of the disk and the distance between them was 90 millimeters. Thus, the molded disk has a straight weld line perpendicular to a line joining the two

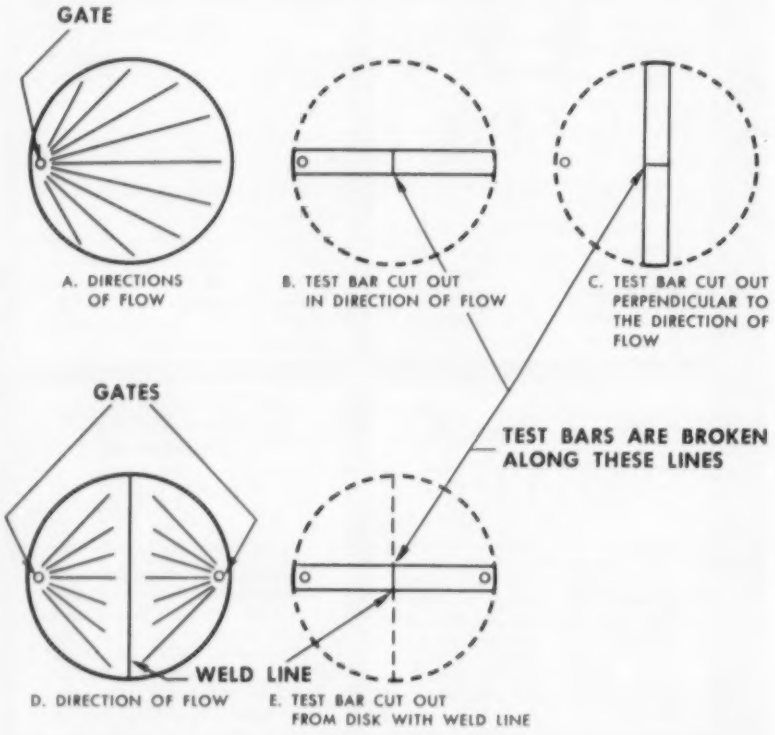
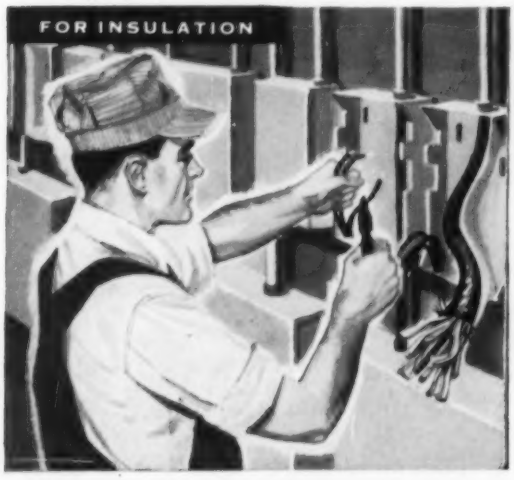

GATE
A. DIRECTIONS OF FLOW
B. TEST BAR CUT OUT IN DIRECTION OF FLOW
C. TEST BAR CUT OUT PERPENDICULAR TO THE DIRECTION OF FLOW
TEST BARS ARE BROKEN ALONG THESE LINES
GATES
WELD LINE
D. DIRECTION OF FLOW
E. TEST BAR CUT OUT FROM DISK WITH WELD LINE

Fig. 1—Diagram showing how test bars of modified polystyrenes were made and how they were broken. Diameter of specimens was 100 mm., thickness 3 millimeters

* Plastics Laboratory, Telefonaktiebolaget L. M. Ericsson, Stockholm 32, Sweden.

Profit with papers by Mosinee

Mosinee impregnating papers replace steel—when treated with synthetic resins to form light, strong, better insulated refrigerator door panels. Mosinee works with many manufacturers to develop impregnating papers of special qualities. In this case, strength and moldability to take deep draws.



Cable wrap of special Mosinee paper winds easily, twists uniformly. Mosinee moisture resistant, extra-strong, electrical cable wrap offers a plus value. Mosinee specialized production controls insure uniformity, minimize problems in high speed twisting and cable wrap operations.

Find out how you can get "MORE PROFITS with PAPER"—for laminations, insulation, packaging, protection, fabricating or processing

Mosinee patented reinforced paper simplifies building construction. Easy to handle Mosinee reinforced papers with steel mesh reinforcing attached, replace wood forms for pouring lightweight concrete floors. This is only one of many instances in which Mosinee cooperated in developing new papers to improve processing or production.

THAT's the theme of a growing number of concerns and industries who have worked with Mosinee experts. They've found Mosinee's more than a quarter century of experience particularly valuable in developing special papers to perform specific functions. They've discovered that Mosinee special papers help complete their product or process faster, easier and usually at less cost.

If you'd like to get a general idea of how Mosinee special papers can be developed or adapted to solve your particular product, production or packaging problems — write or see your Mosinee representative. Find out how you, too, can profit more with papers by Mosinee.

MOSINEE PAPER MILLS COMPANY
DEPT. M • MOSINEE, WISCONSIN

Mosinee

— specialist in industrial paper technology — makes fibres work for industry.

gates. Test bars of the same dimensions as above were cut out by machining in a direction perpendicular to the weld line.

The test bars cut from the disks were tested for impact strength with a Charpy pendulum. The energy of the pendulum was 40 kg.-cm. and the distance between the anvils was 50 mm. The test bars were placed so as to be hit by the pendulum in the middle of the bar on an unmachined surface. In the case of bars with weld lines, the pendulum will hit the weld line. Figure 1, p. 150, illustrates how the bars were made and broken.

The energy required to break the bars was calculated in kg.-cm. units. As the densities of the different materials are approximately the same, the impact values are comparable without correction for the toss factor.

Each test was made on 20 test bars and the mean value of the impact strength was calculated. Limits for this mean value were also calculated on a statistical basis in such a manner that, if the test were repeated, the mean value would fall between the limits with a probability of 99 percent. The standard deviation was also determined.

Materials Tested

The materials examined have been designated with capital letters as follows:

A—General-purpose polystyrene.

B—A blend of polystyrene and a styrene-butadiene copolymer, containing a small proportion of liquid lubricant and an antioxidant.

C—An alloy containing polystyrene and styrene-butadiene copolymer.

D—Styrene-acrylonitrile copolymer.

Material *A* was clear and transparent without lubricants. Materials *B* and *C* were whitish and nontransparent. Material *D* was transparent and yellow. The four materials were made in different countries (England, France, Sweden, and United States).

Molding Conditions

The disks for testing were injection molded with a machine of American make, Fellows-Leominster 1-B3-15, 3 ounces. Particulars of molding conditions are given in Table I. The machine was first run for a time sufficient to reach equilibrium molding conditions. Disks for testing were then molded. The molding conditions were chosen in such a manner that the best result for each material could be expected. It should be noted that a lower pressure on the plunger could be used for the two modified types *B* and *C* than for the general-purpose material *A*. Excessive pressures were avoided, but pressures were high enough to fill the mold quickly. The plunger times were kept as short as possible without producing sink marks on the disks.

Results of Impact Tests

As is evident from Table II, p. 157, when the molded disks are subjected to shocks, they preferably tend to break along the direction of flow, i.e., the disks are anisotropic in a mechanical sense. This is also in line with practical experience that most injection molded articles of polystyrene exposed to bending forces and shocks will preferably break along the flow lines. There are two causes of this anisotropic effect; one is inherent in the materials and the other is intimately bound up with the design of the mold and, to some extent also, with the molding conditions. The first of these causes is easily understood. The polystyrene is a high polymer built up of long chain molecules. During molding, these molecules will be oriented to some extent in the direction of flow. With respect to mold design, preferred directions of flow are hardly avoidable, i.e., points of weakness are always present in a molded piece. Therefore, it seems advisable to judge the strength of the materials on the test bars in Fig. 1c, i.e., those which are broken along direction of flow.

As is seen from Table II, p. 157, material *A* (general-purpose styrene) shows the greatest anisotropic effect. It is also the weakest material, since the lowest impact resistance is found in test bars cut perpendicular to flow. It is also evident that the modification of polystyrene has improved the impact resistance considerably. The two materials *B* and *C* are somewhat better than material *D*. Further investigations on different samples of material *D* have revealed that the impact resistance, as determined by the method herein described, is dependent upon the intrinsic viscosity of the material.

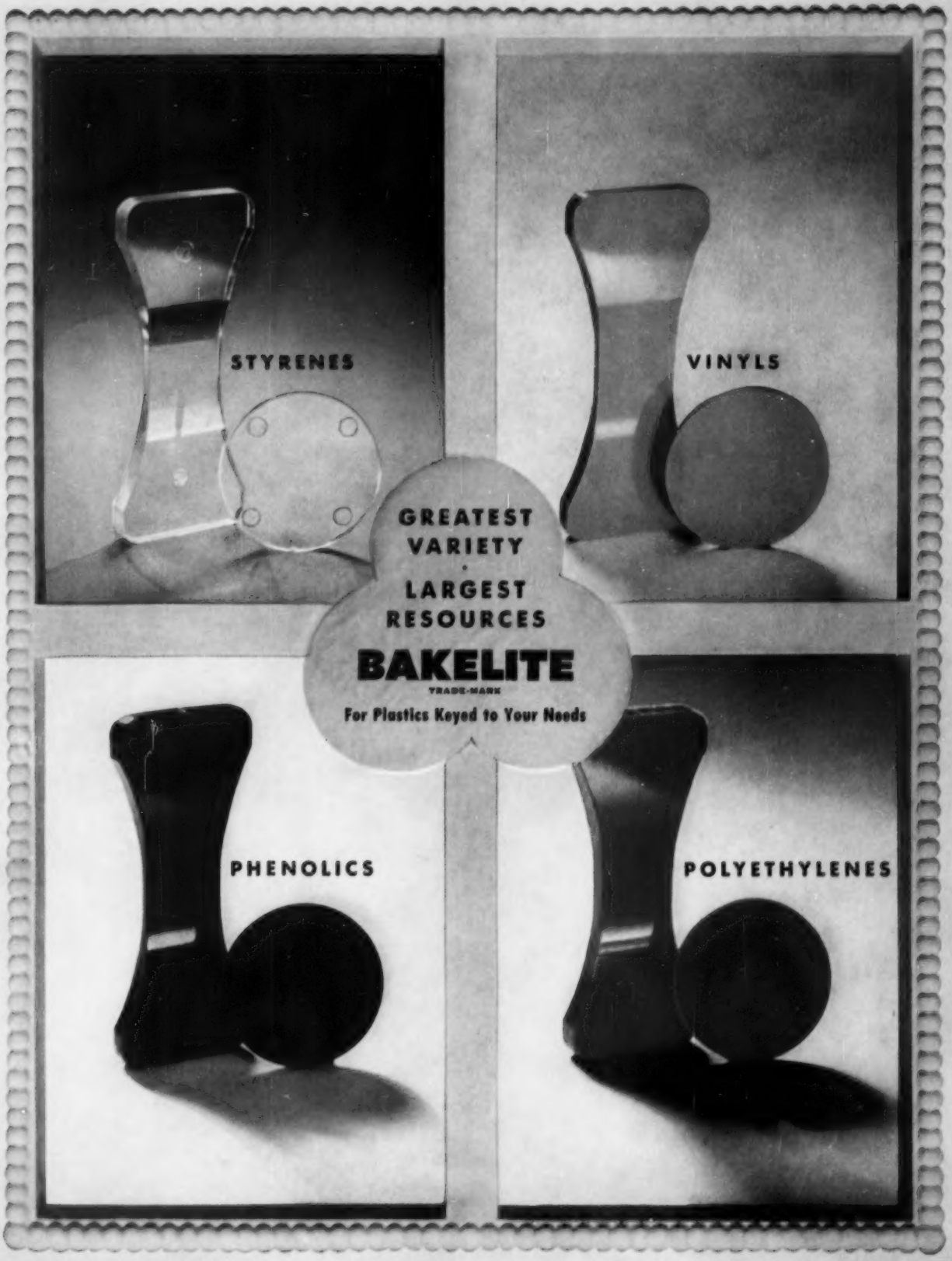
An examination of the *weld lines*, however, shows that they are strongest in the *D* material. This result is of great importance, since weld lines very often occur in molded pieces. Therefore, material *D* may have some advantages over the other materials for the molding of

(*To page* 157)

Table I—Molding Conditions for Test Disks[a]

	Temperature			Time					
	Cylinder								
Material	Front	Rear	Mold	Plunger	Booster	Die	Recycle	Total cycle	Plunger pressure
	°C.	°C.	°C.	sec.	sec.	sec.	sec.	sec.	kg./cm.²
A	190	190	65	12	2.5	10	13	35	1400
B	200	145	55	10	3	15	15	40	980
C	200	145	55	10	3	15	15	40	980
D	190	195	55-60	8	4	20	12	40	1400

[a]Molding conditions for the disks were the same with one gate as with two gates (weld line disks). About 37% of rated machine capacity was used. Plunger times include booster times.


STYRENES
VINYLS
GREATEST VARIETY
·
LARGEST RESOURCES
BAKELITE
TRADE-MARK
For Plastics Keyed to Your Needs
PHENOLICS
POLYETHYLENES

BAKELITE

C-11 PLASTICS

Case and cover molded by **Vichek Tool Co.,** Cleveland 4, Ohio, for battery made by American Machine & Foundry Co., Micro-Pak Power Div., Colorado Springs, Colo.

Boasting 100 per cent reliability, this compact silver-zinc battery is used in airborne ordnance, guided missiles, and jet aircraft starting systems. It strikingly demonstrates the serviceability of BAKELITE Brand C-11 Plastic, the material from which its case and cover are molded.

BAKELITE C-11 Plastic, an acrylonitrile-styrene copolymer, is chemically inert to the battery's potassium hydroxide. C-11 has the toughness, rigidity, and tensile strength to withstand vibration and mechanical and thermal shock; outside dimensional tolerances are not distorted by internal and external pressures. C-11's heat distortion point is above the 170-180 deg. F reached by the battery's high current rate discharge. Case and cover are joined with compatible cement. Excellent transparency permits inspection of the battery during assembly and operation.

BAKELITE

STYRENE PLASTICS

Caps made by **Major Seal Corp.,** Los Angeles 34, Calif.

Keeping the fizz from becoming a fizzle is the job of this handy bottle seal, its attractive outer cap molded of BAKELITE Brand Styrene SMF-3500. The lustrous color goes all the way through; cannot wear or wash off. The cap keeps its shape because of the material's dimensional stability.

BAKELITE Styrene SMF-3500 gives molders the combination of high plasticity and fast set-up time in a general purpose material. As a result, they can fill more cavities and mold larger pieces while using the same molding cycle employed with ordinary styrenes. Molding pressures can also be reduced—sometimes as much as 25%.

SMF-3500 offers excellent clarity for transparent parts, either colored or crystal. Rigid quality control assures batch-to-batch uniformity of its properties, resulting in fewer rejects, less waste.

BAKELITE

TRADE-MARK

GREATEST VARIETY, LARGEST RESOURCES FOR PLASTICS KEYED TO YOUR NEEDS

It's most economical, least time-consuming to get a *complete service package* from one dependable source. That's why it makes sense to do business with Bakelite Company.

Bakelite Company offers the most comprehensive package of all, both in terms of product and service. A wide variety of plastics is always available to meet your requirements. The experience and knowledge of one of the largest research and development teams in the industry are yours to draw on whenever you need them. Uniformity of materials, strategically located plants and warehouses, and prompt delivery and service complete the package. Put it to work for you. Write Dept. LK-104.

BAKELITE POLYETHYLENE PLASTICS

"Bracon" Tubes molded of BAKELITE Brand Polyethylene by **Bradley Container Corp.,** Maynard, Massachusetts

These tubes—molded of BAKELITE Brand Polyethylene—are a fast-growing packaging development because they have so many new advantages.

For example, they instantly recover their shape after squeezing. Label and directions stay in plain sight. Excess contents are drawn back in, so tips stay clean and unclogged. The natural resilience of polyethylene makes the tubes less subject to cracking and rupturing. Ends are closed with a strong heat-seal.

Both translucent and brightly colored tubes are produced, and take printing in close registration. BAKELITE Polyethylene's inherent resistance to chemicals, solvents, and moisture equips them to handle a variety of liquids, creams, drugs, and pastes. Since it's the lightest commercial plastic, the tubes also reduce shipping costs.

BAKELITE PHENOLIC PLASTICS

X-ray film unit molded by **Sulak Manufacturing Co.,** Seattle, Wash., for Ind-X System, Inc., Seattle, Wash.

This portable unit for loading, exposing and processing industrial X-ray films in daylight consists of three sections molded of BAKELITE Brand Phenolic BMG-5000 Black. It's designed and built for hard use . . . indoors or out . . . in the field or factory.

But in selecting the molding material, the makers had much more to consider than mechanical strength alone. BMG-5000 is a general-purpose material that withstands repeated exposure to corrosive photographic solutions, both acid and alkaline. It keeps its dimensional stability despite extremes in temperature found in the field. It has good moldability—close tolerances, freedom from warpage and blisters.

If your product needs this combination of properties, look into this superior general-purpose Phenolic.

BAKELITE BRAND PLASTICS

PHENOLICS • STYRENES • IMPACT STYRENES
POLYETHYLENES • VINYLS • POLYESTERS
EPOXIES

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N.Y.
In Canada: Bakelite Company, Division of Union Carbide Canada Limited, Belleville, Ontario
The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

no wrong numbers here . . .

FLEXOL PLASTICIZERS DOP, 426, 810, 10-10, and CC-55

Trade-Mark

Each one has its place in plastics, and each one rates a listing on your books. These phthalates offer excellent heat and light stability, good resistance to water extraction, and excellent electrical properties. In addition, these five FLEXOL Plasticizers allow you to select the phthalate with the proper volatility, solvent power, and dispersing action for your use. Check these phthalates before you consider any other plasticizer for your vinyl plastics or nitrocellulose lacquers.

CARBIDE AND CARBON CHEMICALS

Carbide and Carbon Chemicals Company
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

FLEXOL Plasticizer DOP (di(2-ethylhexyl) phthalate)—the "standard" plasticizer for vinyls for more than ten years.

FLEXOL Plasticizer 426 (a mixed alcohol phthalate) saves you money and offers quality, too.

FLEXOL Plasticizer 810 (a higher alcohol phthalate) is outstanding for its low volatility and the improved low-temperature properties it imparts to vinyls. Plastisols made with 810 have excellent viscosity stability.

FLEXOL Plasticizer 10-10 (didecyl phthalate) is the least volatile of phthalate plasticizers—it has good electrical properties and is a good dispersant, too.

FLEXOL Plasticizer CC-55 (di(2-ethylhexyl) hexahydrophthalate) is an excellent dispersant for vinyl plastisols with stable, low viscosities.

To be sure you have the right phthalate every time, call or write the nearest CARBIDE office. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Toronto.

The term "Flexol" is a registered trade-mark of Union Carbide and Carbon Corporation

Table II—Impact Strength of Test Bars[a]

Material	Mold with one gate: Flow in direction of bar — Impact strength	Std. dev.	Mold with one gate: Flow perpendicular to direction of bar — Impact strength	Std. dev.	Mold with two gates (bar with weld line) — Impact strength	Std. dev.
	kg.-cm.	kg.-cm.	kg.-cm.	kg.-cm.	kg.-cm.	kg.-cm.
A	7.40 ±0.60	0.94	0.82 ±0.12	0.19	0.94 ±0.11	0.17
B	8.07 ±0.56	0.88	5.36 ±0.23	0.37	0.49 ±0.03	0.05
C	13.62 ±1.63	2.55	6.12 ±0.44	0.68	1.15 ±0.08	0.12
D	9.73 ±0.74	1.15	4.05 ±0.44	0.69	1.49 ±0.06	0.10

[a]The test bars were 3 by 10 by 100 millimeters. The limits of impact resistance calculated for a risk level of 1 percent. A higher risk level will, of course, bring the limits closer together.

intricate shapes where weld lines cannot be avoided. Material *B* shows a fair strength of the weld line, which is weaker than in material *A*. Materials *B* and *C* will give the strongest moldings when the shape of the article is such that flow lines will not be very prominent. Thus, the choice of material will depend upon the requirements, the shape of the article, and the design of the mold.

Aging

From the foregoing it is evident that the modified polystyrenes, *B*, *C*, and *D*, all possess advantages over the ordinary polystyrene in impact strength of freshly molded pieces. Up to now only a few aging tests have been completed. Measurements of impact resistance of material *A*, according to the method described here, have proved that a marked decrease takes place after storing of the disks for 1 yr. in a dark cupboard. These storage conditions are, however, much more favorable than will be encountered in the everyday use of a telephone set. Accelerated aging, on the other hand, may introduce effects that would not appear in actual use and materials would thus be erroneously rejected on that account.

Material *D* was also examined after the lapse of 1 year. The impact resistance had also dropped, but not so much as for material *A*. The aging tests of materials *B* and *C* have not yet been completed.

Scratch Resistance

This property may be of interest not only to manufacturers of telephone sets, but also to makers of articles subjected to scratching by nails, pencils, etc. Scratch resistance must not be confused with hardness. Many soft materials, such as rubbers and plasticized polyvinyl chlorides, show a very good resistance to scratching. Therefore, it is obvious that in many cases hardness does not constitute a specific constant to describe the scratch resistance of a material.

A special testing method has been developed and seems to give a fair evaluation of this property. A plane surface of the plastic material is scratched at a definite pressure with a tool of special design. The width of the scratch is taken as a measure of scratch resistance. In this manner the polystyrenes prove to be somewhat inferior to wood-filled phenolics but superior to the cellulosics, of which the most scratch-resistant types are difficult to mold. The four materials, *A*, *B*, *C*, and *D*, proved to have almost the same scratch resistance. Material *D* was possibly slightly better than *A*, *B*, and *C*.

Insulating Properties

It is not, *a priori*, necessary to choose an insulating material for telephone housings. In certain designs metal cases are used, but to a very much lesser extent than plastics.

The good insulating properties of modified polystyrenes are essential in many other electrical applications, especially where low losses are required. Therefore, it is of general interest to examine the dielectric constant (ε) and tan δ for the modified polystyrenes. Material *A* possessed a low dielectric constant, about

(*To page* 259)

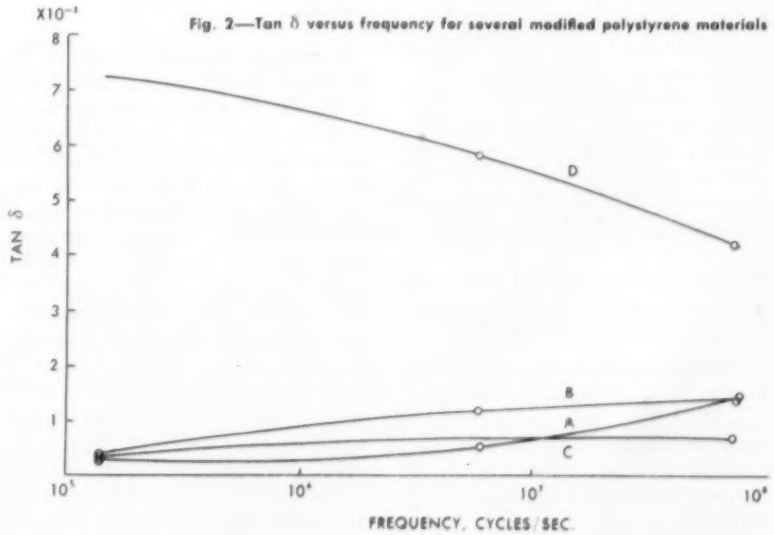


Fig. 2—Tan δ versus frequency for several modified polystyrene materials

PLASTICS DIGEST*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. For complete articles, send requests direct to publishers. List of addresses is at the end of Plastics Digest.

Materials

NON-METALLIC NEW MATERIALS IN ENGINEERING. N. J. L. Megson. Trans. Inst. Marine Engineers *67*, 77-92 (Mar. 1955). Plastics developed in recent years that have found application in the production of structural components are surveyed. Particular attention is given to the glass fiber and asbestos reinforced plastics which can be molded at pressures much lower than those essential for conventional plastics. The materials used and methods of molding are reviewed. The properties of the molded products are discussed, emphasis being placed on the necessity for utilizing the figures obtained in a manner different from that possible with metals. Advantages and disadvantages are summarized, and some account is given of known applications of the products. Future developments and subjects that need study are discussed.

METAL SOAPS AS VINYL STABILIZERS. W. G. Vennels. Plastics (London) *20*, 93-96 (Mar. 1955). Metal soaps are growing in importance as vinyl stabilizers since they not only stabilize by neutralization of hydrogen chloride given off during degradation but they also lower the processing temperature and provide internal lubrication. A stabilizer should be permanent and show no deleterious effects upon physical properties; should be immune from the leaching effects of water and have good resistance to extraction by oils and fats; should lack odor, taste, and toxicity when foodstuffs are involved; should neither "bloom" nor "sweat." The properties of numerous metal soaps are reviewed as a guide to their use as vinyl stabilizers.

STRENGTH OF HEAT-CLEANED GLASS CLOTH. F. F. Jaray. Brit. Plastics *28*, 155-56 (Apr. 1955). The loss in strength of glass fibers during heat-cleaning is attributed to fracture of the surfaces caused by heating up air inclusions contained in the fibers. Application of a finish or surface treatment restores the strength of the heat-cleaned glass by cementing adjoining fibers.

APPLICATIONS OF CASHEW NUT SHELL LIQUID RESINS. E. M. Evans. Rubber and Plastics Age *36*, 278-9, 281 (May 1955). Adhesives, coatings, and plasticizers made from cashew nut shell oil are reviewed.

PROPERTIES OF OPPANOL BA FILM. H. Lange. Der Plastverarbeiter *6*, 58-75 (Feb. 1955). Oppanol BA is a high - molecular polyisobutylene, thoroughly mixed with organic and inorganic fillers—especially highly reactive carbon black—and subsequently calendered to films of 1- to 2-mm. thickness. At room temperature, the average tensile strength in the lengthwise direction is about 430 p.s.i. and in the crosswise direction approximately 360 p.s.i. with the corresponding strain at failure of 370 and 470%, respectively. Other properties such as notch sensitivity, thermal conductivity, behavior under water pressure, permeability, and others are reported. The films are used in constructions as protection against humidity and water seepage.

IRRADIATED ORGANIC MATERIALS. S. T. Jones. Canadian Plastics *1955*, 32-39, 68, 70 (Apr.) Nuclear radiation is a form of energy becoming increasingly available but which has found relatively little practical application to date. When absorbed in organic matter, nuclear radiations may produce various amounts of heat, light, and chemical reaction. The physical and chemical properties of organic materials that may be changed by the absorption of radiation are discussed with emphasis on chemical reactions. Many such materials are discolored by irradiation, and many show changes in various electrical properties such as conductivity. As regards chemical reactivity, many organic materials show either one or the other of two tendencies to a greater degree: they may be broken down by radiation to form simpler products of lower molecular weight than the parent material, or they may be converted into materials of higher molecular weight through polymerization or cross-linking. The efficiencies of the processes and the nature and amounts of radiation-produced substances are influenced by specific chemical factors such as the stabilizing effect of aromatic rings, the specific behavior of certain functional groups, and environmental effects such as temperature, presence of oxygen, water, etc. It is expected that radiation processing will find its most useful applications not in competition with conventional processes but where it can be employed in smaller amounts to accomplish unique or unusual results.

Molding and Fabricating

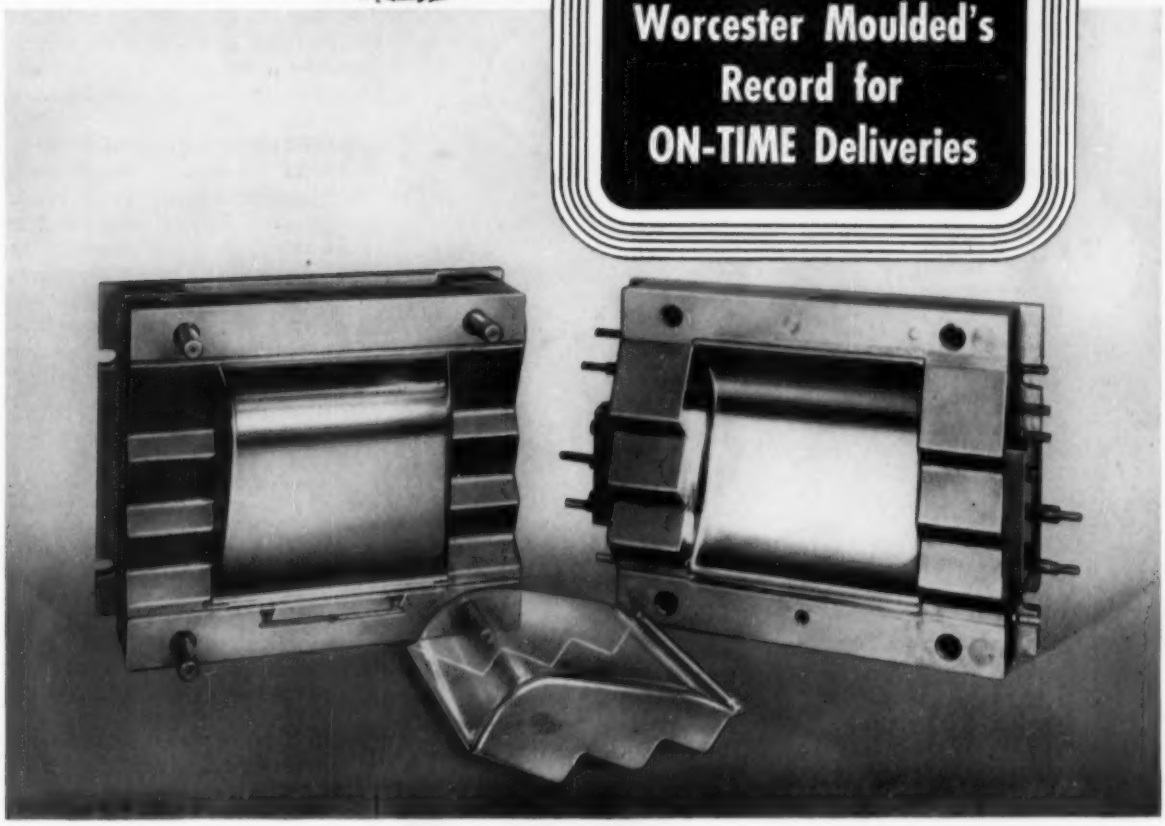
CENTRIFUGAL CASTING OF POLYETHYLENE. Brit. Plastics *28*, 126-29 (Apr. 1955). The extrusion of polyethylene tube beyond 12 in. diameter ceases to be practical for technical and economic reasons. Tubing up to 36 in. in diameter has been made, however, by centrifugal casting. Limitations are lower output and a fixed tubing length. The method used is similar to the casting of metal pipes. A cylindrical metal pipe, heated externally along its length, is used as the mold. It is mounted on rollers and driven by an electric motor at a speed which varies during the casting cycle and with the diameter of the tube to be made. The heated, rotating mold is charged with a calculated quantity of polyethylene which fuses and forms a homogeneous coating on the inside of the mold. The mold is gradually cooled while rotating and when the system is cooled to below 40° C. the finished polyethylene tube will have contracted enough to allow it to be extracted from the mold.

RECENT DEVELOPMENTS IN CALENDERS FOR PVC. R. S. Colborne. Brit. Plastics *28*, 134-39 (Apr. 1955). Various calender arrangements, calender roll compositions, types of bearings, lubrication of bearings, methods of allowing for the deflection of rolls, roll heating, nip adjustment,

* Reg. U. S. Pat. Off.

Marmots roll out of winter quarters the first week in April - without fail

Even a Marmot Couldn't Better Worcester Moulded's Record for ON-TIME Deliveries



Your custom moulded plastics parts, delivered where and when you want them — as promised — perform a job that will save you time as well as money. Why? Because those fulfilled WMP promises enable you to stick with your original production schedules — freeing you from delays and idle man-hours.

You save dollars too, because Worcester Moulded's critical inspectors maintain a strict quality control. Your production suffers no interruptions from rejected plastics parts.

Find out why it pays to become a "Partner in Time" with WMP — by letting us put our complete moulding and vacuum metallizing facilities to work for you.

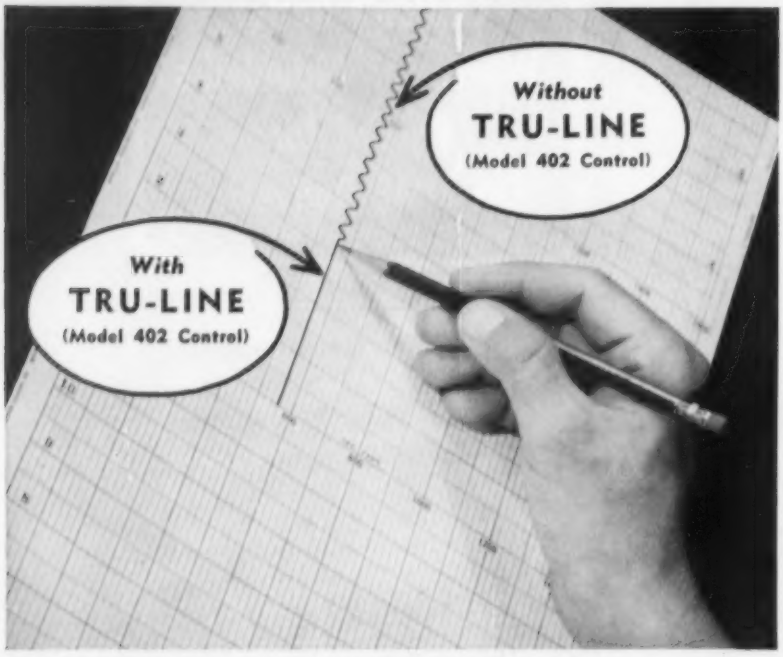
Custom Injection Mouldings of Custom-Made Quality

WORCESTER MOULDED PLASTICS CO.

14 HYGEIA STREET, WORCESTER 8, MASS.

BARBER COLMAN

New Wheelco Model 402 Capacitrol



Upgrades quality of injection and extrusion moldings and helps keep you competitive!

Temperature control that's "on the button" without wavering above or below the control point is now possible with the new TRU-LINE Capacitrol (Model 402). You'll get a sure shot every time when your injection or extrusion molding machines are controlled by this dependable, electronic time-proportioning instrument. The Model 402 features "anticipatory" action within the packaged *electronic* control unit. Correct temperature value is always indicated without disturbance of the measuring circuit. Control benefits are not offset by maintenance difficulties, either. Interchangeable unit construction simplifies service and on-the-job modifications. By any standards, the Wheelco "Model 402" is your best answer to temperature control of molding machines. Write for Bulletin F-6314-1.

WHEELCO INSTRUMENTS DIVISION

Barber-Colman Company

BARBER-COLMAN COMPANY, DEPT. W, 1517 ROCK STREET, ROCKFORD, ILLINOIS

BARBER-COLMAN OF CANADA, LTD., DEPT. W, TORONTO & MONTREAL, CANADA

Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Small Motors
Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

and gearing are discussed. Four-roll calenders may be arranged in four ways: four in line, L type, inverted L, or Z type. Calender rolls are usually made of chilled cast iron. The majority of manufacturers use plain sleeve bearings, flood lubricated, although some use roller bearings. To allow for the deflection of the rolls under pressure and to produce a flat sheet, three methods are now employed: crowning, axis crossing, and counter-bending. Drilled rollers are favored by British and American manufacturers, but German manufacturers retain cored rolls. The nip adjustment is now usually motorized through high ratio reduction gears, sometimes with two-speed motors for fine adjustment. The standard method of driving the calender is by double helicals mounted on the end of the rolls.

Applications

SYMPOSIUM ON PLASTICS AS MATERIALS OF CONTRUCTION. Ind. Eng. Chem. 47, 1292-1367 (July 1955). Seven papers on engineering aspects and evaluation, three on equipment applications, and five on industry applications are presented in this symposium. The purpose of this symposium was to focus attention on a new class of engineering materials. The synthetic organic plastics are assuming an important position among the older structural materials such as wood, concrete, and the metals. These new materials provide design engineers and architects with combinations of properties that are not obtainable with older materials. Lightness of weight coupled with resistance to corrosion and ease of fabrication into complex shapes make the organic plastics particularly interesting to designers of industrial plants and equipment. The papers show that plastics are slowly making their way in the chemical industry. It is significant that plastics frequently make their entry into an operating plant through the maintenance section, whose task it is to keep the plant operating. When other materials of construction prove inadequate, maintenance engineers may turn, in desperation, to plastics to keep the wheels turning. Designing plastics into new plants, however, requires engineering data, ensured sources of supply, and specifications—all well established

How to choose and use the right plastics material

I.C.I. will help you choose the *right* plastics material for the job you have in mind. They'll settle any problems you may have concerning suitability, cost and production.

When you've decided on the material and the process, they will give you the benefit of their Technical Service which is world wide. From then on it's plain sailing—mainly because stringent technical precautions are taken to ensure that the very high quality of I.C.I. materials *never* varies.

I.C.I. scientists and technicians are constantly carrying out research on new materials and the development of existing ones. Close watch is kept on production to ensure a consistently high quality for all products. They are therefore able to give advice based on this extensive experience.

The names of the products illustrated are registered trade marks, the property of I.C.I.

U.S.A. enquiries to :
J. B. Henriques, Inc.,
521 Fifth Av., New York 17, N.Y.

Canadian enquiries to :
Canadian Industries (1954) Ltd.,
Plastics Dept., Box 10, Montreal, P.Q.

IMPERIAL CHEMICAL INDUSTRIES LIMITED
Plastics Division, Export Dept., Black Fan Road, Welwyn Garden City, Herts.

ICI
OP.14

You can have either on vinyl sheeting, and eliminate an extra polishing run as well. Simply add the Liberty Polishing Unit to your calender and watch it perform. Works equally well on virgin and reprocessed materials.

And here's news! This hydraulically powered unit actually increases production because it may be used to *decrease* the gauge of material as it comes from the calender and polish it in a single operation.

To get complete details on the Liberty Polishing Unit and other equipment for plastic sheet processing, write today for free catalog. Address: Liberty Machine Co., Inc., 275 Fourth Ave., Paterson 4, N. J.

LIBERTY MACHINE CO. INC.

Fast, Thorough, Economical Drying with the

D & W HOPPER DRYER

- Less Handling—material goes direct from receiving to machine
- More Production—material thoroughly conditioned, pre-heated
- Better Quality—thermostatic temperatures eliminates variables
- More Usable Floor Space—install it on top or side of machine
- Economy—initial cost is less than conventional drying oven!
- Easily installed on any standard injection or extrusion machine

Write today for complete information on how this machine can help you

THORESON - McCosh Inc.

18208 W. McNICHOLS DETROIT 19, MICHIGAN KENWOOD 1-8877

for metals, ceramics, and concrete but in early stages of development for most plastics. Designers of chemical plants cannot wait for these to be completed. They must specify conventional materials, realizing that they may be doomed for early replacement while properly chosen plastics would be permanent and frequently lower in cost. These symposium papers emphasize the need for design data that can be used with assurance.

DROP-TANKS FOR AIRCRAFT MOLDED IN PHENOLIC/ASBESTOS. Brit. Plastics *28*, 60-61 (Feb. 1955). A plastic drop-tank is described which has a first cost estimated to be 25 to 30% less than the equivalent in aluminum. The tank is made in three sections consisting of an elliptical nose shell, a parallel center shell, and a tapered rear shell. Long-fibered asbestos, in the form of a felt, impregnated with phenol-formaldehyde resin is the material generally used in aircraft work where high strength characteristics are required. Tests have shown that fully cured phenolic asbestos is unaffected by extremes of temperature and humidity.

SYNTHETIC FABRIC-ACRYLIC RESIN IMPREGNATES FOR AIRCRAFT CANOPY EDGE ATTACHMENTS. W. G. Carson and E. N. Robertson. Aeronautical Eng. Rev. *14*, 44-9 (Mar. 1955). Impregnates made from acrylic resin and various synthetic fabrics were evaluated for general physical properties and especially for those characteristics pertinent to their use as aircraft canopy edge attachments. A description is given of the effect of the type and construction of the reinforcing fabric on impregnate physical properties, and a comparison is made with properties of an acrylic-glass fabric impregnate of a type in current use. Synthetic fabric impregnates are more suitable for the canopy edge attachment application since these impregnates have a thermal expansion coefficient more nearly equal to cast acrylic plastic than the glass fabric impregnates. Therefore, thermally induced stresses in the adhesive bond between the canopy and edge attachment are largely eliminated. Strength properties of synthetic fabric impregnates are adequate for the edge attachment application but, in general, are not equal to those of

glass fabric impregnates. Synthetic fabrics have strength and moduli characteristics nearly equal to those of the resin and thus do not supply much reinforcement for the resin, but they do act to reduce resin notch sensitivity. The mechanism of impregnate failure is discussed briefly, and methods of increasing strength properties by hot-stretching impregnates are described. It is concluded that synthetic fabric impregnates should be entirely suitable for canopy attachment applications when properly designed and that the best synthetic fiber for this application is Orlon.

PVC Ducting for Mining Ventilation. F. W. Raspass. Brit. Plastics *28*, 86-88 (Mar. 1955). A polyvinyl chloride ducting has recently been developed for mine ventilation. It consists of unsupported polyvinyl chloride sheeting 0.025 in. thick welded into required lengths and diameters and used with steel coupling and stiffener rings. It is rotproof, corrosion resistant, will not support combustion, and has a tensile strength of 3200 p.s.i. Airtight connections between lengths of ducting are made with a patented hinge clip. The pressure losses in polyvinyl chloride ducts are of the order of 12% less than those in metal ducts.

European Developments in the Dielectrics Field. G. De Senarclens. Electrical Mfg. *56*, 119-25 (Aug. 1955). European developments in cellulose acetate paper, cast epoxy resin instrument transformers, epoxy resin mica paper, polyurethane enameled magnet wire, epoxy resin impregnated mica foil, and expanded polystyrene are described.

Engineering Properties of Plastics for Building. A. G. H. Dietz. Plastics Tech. *1*, 282-87, 302 (June 1955). The ranges of strength, stiffness, thermal properties, corrosion resistance, and durability of plastics in comparison with the familiar metals, wood, and concrete used in building are described. The engineering aspects of laminates, reinforced plastics, and sandwiches are considered. The major trends occurring in building design and how plastics fit into these trends are reviewed. Plastics possess their own combinations of advantages and limitations which set them off from other materials. Attempts to use them like other materials are likely to produce unhappy results, and are certain to fail to use them most advantageously. Properly and imaginatively used, with an intelligent understanding of their properties, they can contribute significantly to the advance of building technology and design.

Coatings

Copolymerization of Alkyd Silicones for Coatings. C. R. Hiles, B. Golding, and R. N. Shreve. Ind. Eng. Chem. *47*, 1418-24 (July 1955). Alkyd-silicone varnishes were made by reacting organoethoxypolysiloxane with alkyd resins having excess hydroxyl groups. A study of several of the important cooking and composition variables of the varnishes was made. Enamels, pigmented with titanium dioxide, were prepared from the varnishes and evaluated. Properties such as gloss and color retention, craze life, and hardness are compared. Properties such as flexibility, impact resistance, alkali resistance, and toluene resistance are discussed. The enamels, generally, were hard, brittle, and deficient in craze life. Their gloss and color retention at 400° F. was good. The toluene resistance of alkyd-silicone was excellent, and the alkali resistance was good. The curing schedule of the enamels, 30 or more minutes at 400° F. was rather drastic, but curing could be accelerated by use of cobalt naphthenate or an acid catalyst such as *n*-butyl acid phosphate.

Photooxidative Degradation of Alkyd Films. E. B. FitzGerald. ASTM Bull. No. 207 65-76 (July 1955). The initial step in the degradation of drying oil alkyd enamels occurs during the air-drying or baking stages of film formation. Oxygen attacks the unsaturation in the oil and forms hydroperoxides. These hydroperoxides serve either to initiate the γ-methylenic chain reaction, which leads ultimately to the formation of useful polymers, or they decompose in side reactions to produce hydroxyl, carbonyl, and other oxygenated groups. The carbonyl groups, especially if they are conjugated with each other or with residual olefinic unsaturation, absorb strongly in the near ultraviolet and significantly at longer

How to increase profit and production

with

SUNFORM

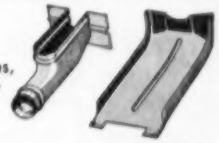
Polyester Pre-impregnated Fabrics* For Reinforced Plastics

Available in widths over 100 inches!

Uniformly impregnated with polyester resin plus catalyst . . . yet it unrolls like plain cloth . . . ready for immediate use, nothing to add.

Easy lay-up saves time and money

Keeps rejects to a minimum because resin impregnation is mechanically controlled for uniformity.



Void-free laminates, superior resin flow even on intricate shapes

No delamination during machining

Cures in 2 to 5 minutes at 250° to 300°F-low pressures

High tensile and flexural strengths, exceptional stability under extremes of temperature and humidity.

High dielectric strength, low loss factor—excellent moisture resistance.

Resists mild acids, alkalies, common solvents, rot, mildew, fungus.

Six month shelf life, no refrigeration necessary. Store at room temperature.

Available in Fire Resistant, Regular, and special Heat Resistant Types

For all types of low pressure molding—matched dies, vacuum bag, pressure bag, contact pressure.

Available in colors (on large orders) and in variety of glass cloth weaves and finishes from .003" to .090".

*Glass currently available in widths up to 64 inches.

Now used in:	Flare housings	Radio cabinets
Aircraft parts	Instrument cases	Surfboards
Diving boards	Marine	Truck & car bodies
Fishing rods	applications	and many others

WRITE TODAY FOR SUNFORM DATA AND SAMPLES

A division of Sun Chemical Corp.

Electro-Technical Products

Dept. E10-1143, 113 E. Centre St., Nutley 10, N.J.

Telephone—Nutley 2-7070

DIVISIONS OF SUN CHEMICAL CORPORATION

HORN • **HUDSON** • **WILLEY** (paints, maintenance and construction materials, industrial coatings) • **WARWICK** (textile and industrial chemicals) • **WARWICK WAX** (refiners of specialty waxes) • **RUTHERFORD** (lithographic equipment) • **SUN SUPPLY** (lithographic supplies) • **GENERAL PRINTING INK** (Sigmund Ullman • Fuchs & Lang • Eagle • American • Kelly • Chemical Color & Supply Inks) • **MORRILL** (news inks) • **ELECTRO-TECHNICAL PRODUCTS** (coatings and plastics) • **PIGMENTS DIVISION** (pigments for paints, plastics, printing inks of all kinds)

Plastics Molding

for America's
LEADING MANUFACTURERS
ALL MATERIALS — ALL METHODS

Northern

47 YEARS OF
PLASTIC MOLDING EXPERIENCE

INDUSTRIAL CHEMICAL CO.
11 ELKINS ST., SO. BOSTON, MASS., SOuth 8-4240

BRANCH OFFICES

ARTHUR F. STOLKEY
Stolkey Sales
10055 James Cousens Hwy.
Detroit 35, Michigan

BRONSON & CO.
279 N. Forge Street
Akron, Ohio

C. GILLIS
P.O. Box 565
Philadelphia 5, Pa.

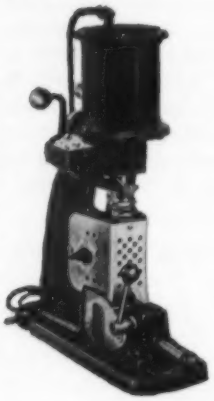
JOHN H. BEACH
739 Powers Building
Rochester 4, N.Y.

ELIOT JACKSON
Riverside Drive
Riverside, Conn.

PLASTICOR

Air-Operated—¼-ounce Capacity
INJECTION PRESS

Gives up to 225 cycles per hour



Ideal for—

• Experimental short runs • Color testing • Molding small precision parts • Novelty items • Parts for hobbyists • Small gears • Nylon bearings • Small patterns for castings • Optical parts • Dental laboratories.

The Model A-2 illustrated handles conventional thermoplastic molding materials.

Power-Pak air cylinder operates from 100-125 PSI air line.
Simple and inexpensive to operate—even semi-skilled help can attain good production speed and high-grade moldings.

Write for complete data and prices.

SIMPLOMATIC MFG. CO.
4416 W. Chicago Ave. Dept. 112 Chicago 51, Ill.

GENERAL ELECTRIC CONTROLS

HENDRICK PANEL SAW

MODEL - MA

FOR PRODUCTION CUTTING OF
Plastic, Plywood and Metal Sheets

Tilts from vertical to 45°. Pictured in tilted position.

A fully automatic and manually operated tool for trimming and sizing large sheet stock. Models with capacities from 4-¼′ to 12-¼′ available. Motors up to 3 H.P. Automatic equipment available for all manual models now in the field. Write for illustrated folder.

HENDRICK MFG. CORP.
MARBLEHEAD, MASS.

wavelengths. Upon exposure to sunlight, these complex ketones immediately begin to produce carbon monoxide, free radicals, new olefins, and lower ketones. If oxygen is present, the free radicals are oxidized to new photolyzable compounds (which may be volatile); the newly formed olefins are subject to repetition of the hydroperoxidation process and the lower ketones continue to be photolyzed until the chain in which they originally existed is consumed. In addition, the free radicals may attack other parts of the alkyd molecule at random or become stabilized by reaction with other radicals. While all of these reactions start in the oil molecule, their damage spreads by repetition until the glyceryl phthalate ester is attacked and ultimately converted into volatile products.

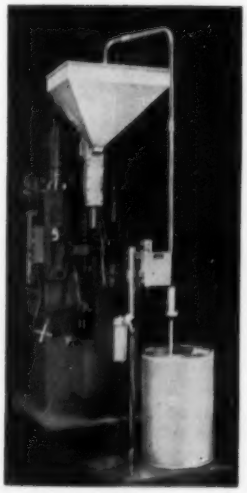
PHOTOCHEMICAL DEGRADATION OF AUTOMOBILE LACQUERS. R. L. Saur. ASTM Bulletin No. 202, 61-5 (July 1955). The weathering factors—light, oxygen, and water vapor—all contribute toward lacquer gloss loss, the rate being more or less dependent on the relative amount of each component and on the wave length of the light. The lacquer film gradually loses thickness on exposure, probably due to erosion of vehicle from the surface. This erosion may be attributed partly to evolution of gases and partly to removal, on washing, of water-soluble deterioration products. Thus, the pigment in the surface of the film becomes more and more exposed as deterioration progresses. The colored pigment, being generally of smaller particles, is also sloughed off with the vehicle, thereby exposing the larger white pigment particles held by the vehicle. A roughened surface results which scatters reflected light, and is characterized by loss of gloss and of reflected image resolution. This light scattering, coupled with loss of colored pigment, also results in a whitened surface. Cellulose nitrate, in the presence of light, is hydrolyzed to cellulose and simultaneously oxidized to liberate certain gases. This removal of vehicle exposes surface pigment, the resulting surface having less gloss. The nitrogen dioxide in the gases evolved, as well as atmospheric oxygen in the presence of light, is

partitions for protective packaging

WRITE, PHONE or WIRE
for QUOTATIONS on
YOUR REQUIREMENTS

peter partition corp.
Manufacturers of Cardboard Partitions
19-21 HEYWARD ST. Telephone: TRiangle 5-4033 BROOKLYN 11, N. Y.

See HOW EASY IT IS NOW TO KEEP YOUR HOPPERS FULL!



MODEL 512A FULLY AUTOMATIC
(Photo Courtesy Lester-Phoenix Inc.)

It's All Done AUTOMATICALLY

Save time and labor by providing each of your presses with a Whitlock Automatic Hopper Loader. Transfers materials automatically from any container at floor level to hopper, regardless of height of hopper or distance of container from press.

Keeps materials at a constant level in the hopper, insuring a uniform supply to the heating cylinder.

Handles all free-flowing granular or pelletized materials, including most regrounds. Easily handles up to 12 lbs. per minute.

Operates by compressed air. Requires only approximately 1 H.P. of compression per unit. Shuts the air off when the hopper is full and turns it on when material is needed.

Write for Literature

C. H. WHITLOCK ASSOCIATES
21651 COOLIDGE HIGHWAY
OAK PARK 37, MICH.

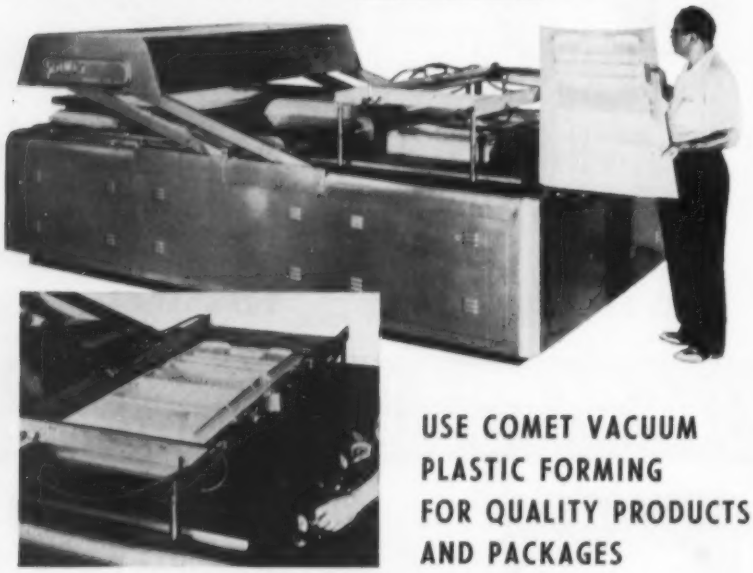
Whitlock AUTOMATIC HOPPER LOADER

OVER 50% REDUCTION IN CYCLE TIME

Comet PEX-TWIN VACUUM FORMING MACHINE

now achieved

THROUGH COMET'S EXCLUSIVE FEATURES*



USE COMET VACUUM PLASTIC FORMING FOR QUALITY PRODUCTS AND PACKAGES

* Air and Water Cooled Clamping
* Air and Water Cooling of Molds
* Automatic, Chilled Air Cooling of Formed Parts
* No Warm-up Time—No Space Heating
* Selective Heat Pattern—Spot Zoning
* Unparalleled Production—Economy—Flexibility

For short runs and experimental work use our manually operated METEOR.

	PRICE RANGE	SIZES
COMET AUTOMATIC TWIN	$5000 to $15,000	24" x 36" to 60" x 96"
METEOR	$700 to $1600	20" x 30" to 30" x 36"

Phone Gladstone 5-0010 collect or cable COMIND for solution to your Vacuum Forming Problems.

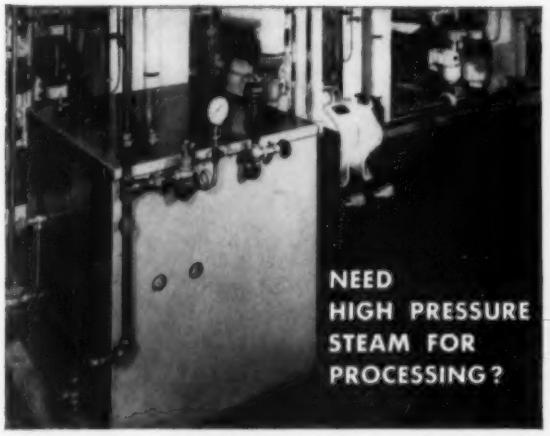
Comet INDUSTRIES
9867 Franklin Avenue
FRANKLIN PARK, ILLINOIS
Progress in Plastics

capable of oxidizing the cellulose to celluronic acid, the major solid deterioration product identified. As cellulose and celluronic acid are both somewhat water-soluble, the action of rain and dew is to further deterioration.

Properties

EFFECTS OF WATER IMMERSION AND HUMIDITY ON THERMOSETTING LAMINATES. R. R. Winans, N. Fried, and W. Hand. Electrical Mfg. *56*, 106-13 (July 1955). The results of investigations on the effects of humidity and water immersion on the electrical and mechanical properties of the following laminates are reported: fabric-base phenolic laminate, paper-base phenolic laminate, glass-melamine laminate, and glass-silicone laminate. The results show that the glass-silicone material is superior to the other materials tested under high humidity conditions or when wet. The other materials showed little correlation between their mechanical and electrical properties. The temperature (30 or 50° C.) and type of immersion medium (distilled or sea water) produced little difference in the results of the mechanical investigations, but were of primary importance in the electrical determinations. The effect of the small increase in temperature from 30° to 50° C. appears to be more detrimental to electrical properties than the change from distilled to sea water. The most deleterious conditioning was the combination of sea water and elevated temperature. The penetration of salt water assisted by the elevated temperature served to produce the most rapid deterioration and to permanently damage the electrical properties of all the materials.

WVP BY ELECTRIC HYGROMETER. M. Karel, Y. Aikawa, and B. E. Proctor. Modern Packaging *28*, 213-15, 322-23 (Apr. 1955). A modified apparatus for measuring the water-vapor permeability of packaging films with an electric hygrometer is described and the results of tests conducted on Mylar film and saran film are presented. The permeability cell consists of two chambers with the specimen between them. Water or a constant-humidity solution is in the lower cell and the sensing element is in the upper chamber;



For as little as $685, a Pantex Speedylectric Steam Generator can be placed adjacent to your process equipment to assure constant temperature, dry steam, "at the flick of a switch." Low in first cost and 98½% efficient, the Speedylectric utilizes the electrode principle of generating steam electrically and requires only about one-half the floor space of conventional boilers with equal capacity. 21 sizes, 1 to 60 Bhp. for operation on 220, 440 or 550v. Write for facts and figures.

Pantex MANUFACTURING CORPORATION

BOX 660-R PAWTUCKET, R. I.

In Canada: Pantex Manufacturing, Ltd.
3556 St. Lawrence Blvd., Montreal

FOR
LUSTROUS
FINISH

TENITE
POLYETHYLENE
an Eastman plastic

EASTMAN CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE
subsidiary of Eastman Kodak Company

ACKNOWLEDGED LEADERS IN PRODUCT IDENTIFICATION SINCE 1902

Kaumagraph's *New* fully automatic
PLASTIC MARKING MACHINE for

Rigid, Semi-Rigid, Flexible Pipe, Hose and Tubing

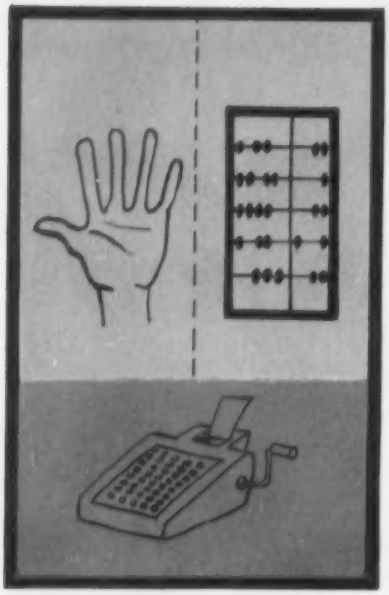
Kaumagraph, originators of dry transfers for industry present a fully automatic precision machine for the lifetime branding of plastic pipe, hose and tubing. Machine operates on the extrusion lines at same speed as your present equipment. Electronic controls assure precision register at intervals entirely flexible to individual requirements. Mark becomes a part of the product . . . does not distort nor interfere with structural strength of pipe or hose. Write or wire Kaumagraph for Bulletin Number 2 giving complete details and illustration.

EXCLUSIVE FEATURES

- ★ Fully automatic—operates on extrusion line with your equipment.
- ★ Accommodates pipe, hose or tubing from 5/16" to 6" diameter at speeds up to 135 feet per minute.
- ★ Handles designs up to 14" in length with interval of marking entirely flexible to individual requirements.
- ★ Machine mounted on steel base with movable control panel. Unit completely wired and ready for immediate installation in your production line.
- ★ No operator necessary.
- ★ Easy to install and maintain.

KAUMAGRAPH COMPANY
Wilmington 99, Delaware • Phone Wilmington 4-2461

Any way you figure



TOOLCAST RESIN DIES

a perfect partner for vacuum and drape forming!

Quick and easy dies that can assure you mass production of products, packages, displays, industrial parts from Thermoplastic films and sheets. Accurate reproductions, strong, durable, dependable, with low cost for material and equipment. Make short runs profitable — reduces die cost for production runs.

product of
AMERICAN RESIN CORP.
3215 No. Sheffield, Chicago 13, Ill.

Please send brochure on TOOLCAST RESIN for Vacuum and Drape Forming dies.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE___ STATE_____

the change in relative humidity in the upper chamber is measured as a function of time. Tests on Mylar showed that the permeability was directly proportional to the vapor-pressure differential and inversely proportional to the film thickness, and that there were no direct effects of temperature on the permeability. It was also found that storage for 72 hr. at different temperatures and humidities had no effect on the permeability of the Mylar film but had a marked effect on saran, the permeability of which decreased as the temperature and humidity of storage prior to testing increased.

INSECT PENETRATION OF FILMS. P. D. Gerhardt and D. L. Lindgren. Modern Packaging *28*, 216-19 (Apr. 1955). The resistance of various packaging films to penetration by common insects was determined. The results indicate that: nontransparent laminated film containing aluminum foil as one of the laminae was relatively resistant to insect penetration but not insect-proof; of the transparent laminated films tested, that consisting of saran 0.0015 in. thick and Pliofilm 0.0012 in. thick was the one most resistant to insect penetration; cellophane films, single and laminated, were readily penetrated by most insects tested; the resistance of polyethylene film to insect penetration varied directly with film thickness.

Testing

FATIGUE TESTING OF NONRIGID PLASTICS. R. H. Carey. ASTM Bulletin No. 206, 52-4 (May 1955). A test method to determine the nature of fatigue of elastomers is described. The fatigue life in nonrigid plastics is primarily a function of the applied stress. A fivefold increase in stress produces a tenfold decrease in number of cycles to failure. In this test, as in most applications, the material undergoes a constant, repeated strain. Under such conditions of flexing, the stress can only be altered by reducing the stiffness of the material. The important point is that fatigue data obtained without regard for stiffness are not only meaningless, but can be very misleading. The testing machine can be used to study a number of simple practical problems such as comparing the fatigue life of two given ma-

Easiest way to move fast is to catch on to something going like a tiger in a tantrum . . . and go swoosh with it.

Like plastics. Companies scouting for fast-moving *new areas to sell* are discovering the plastics market . . . and expanding with it.

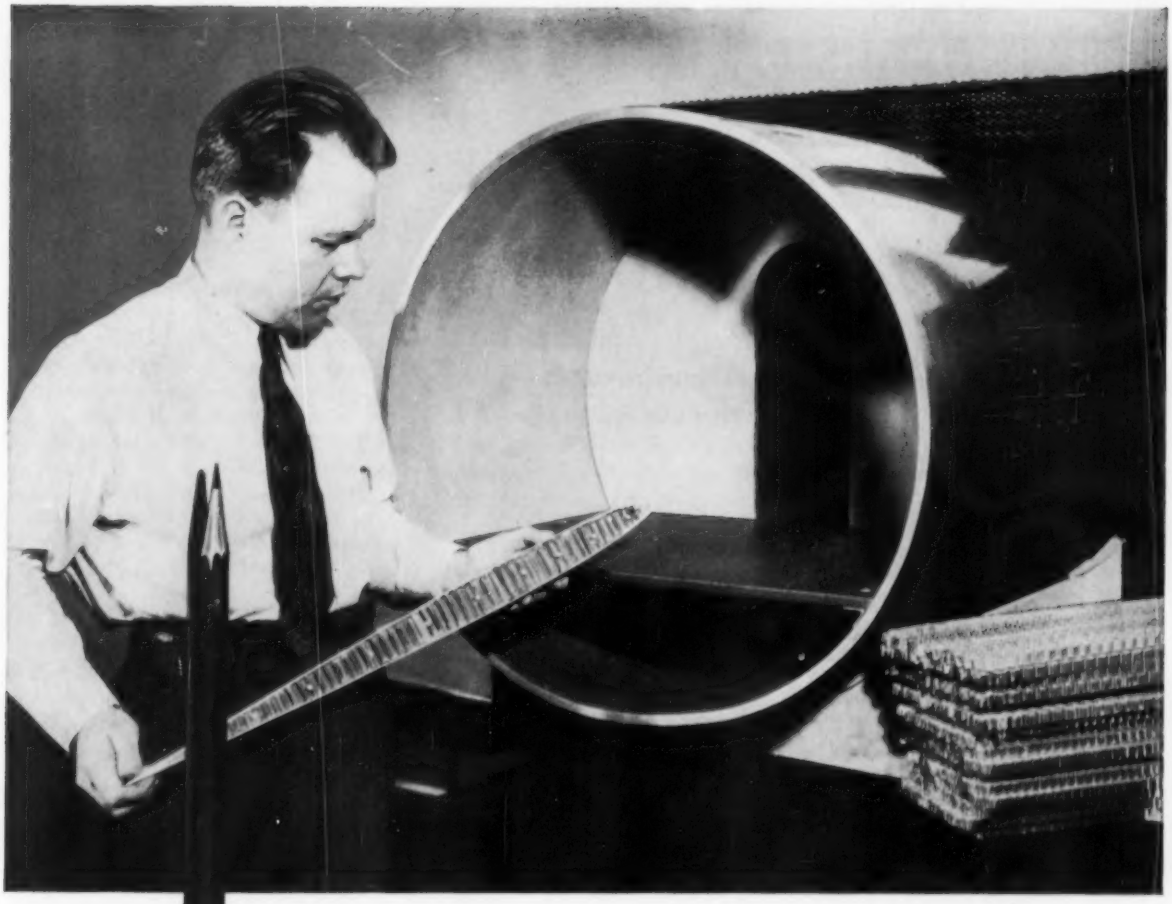
See what's afoot: More than half of today's toys are plastic . . . and the toy business is booming. Records, pop and classical, are plastic . . . and platters are going like hotcakes. Cars, refrigerators, hardware . . . almost everything is using more and more plastics —to sell more . . . or cut costs . . . or make a better product.

What can *you* sell to the people who use plastics? Not just the "makings" of plastics . . . but machines, tools, a raft of supplies.

To explore the field, drop a line to MODERN PLASTICS, the business magazine that has helped bring up the plastics market from a cub . . . doing a fine job for everyone who makes plastics . . . or uses plastics . . . or sells to *them*.

MODERN PLASTICS

A Breskin Publication
575 Madison Avenue
New York 22, New York
Member ABC-ABP



this man knows Honeycomb!

He's Ted Pajak, a pioneer in the research, development and application of aluminum honeycomb materials. Ted has more than ten years experience in the structural sandwich field and holds several of the basic patents on core and sandwich fabrication. He is one of several Hexcel engineers ready to lend their know-how to your most difficult fabrication problems. Hexcel GLASS FABRIC, COTTON FABRIC and ALUMINUM Honeycomb is available in flat sheets, pre-shaped forms and tapered sections as required, and conforms to applicable Government and aircraft specifications. If you have a problem, phone, write or wire...

HEXCEL PRODUCTS INC.

FORMERLY
CALIFORNIA REINFORCED PLASTICS COMPANY

951-61ST ST., OAKLAND 8, CALIFORNIA
1038 W. ARBOR VITAE ST., INGLEWOOD 1, CALIFORNIA
6710 DANVILLE AVE., BALTIMORE 22, MARYLAND

low cost, break resistant

ELECTROFORMED MOLDS

like these

Spell F-A-S-T C-Y-C-L-E-S and A-C-C-U-R-A-C-Y in plastisol molding and vacuum forming

Top photo courtesy Dimensional Products Co., Milwaukee, Wis.

PLASTISOL MOLDERS:

High, even transfer heat results in rapid cure, uniform product thickness. Made from new hard copper alloy which withstands use without breakage.

VACUUM FORMERS:

Water-cooled electroformed copper molds permit you to run faster, achieve higher production. We can make multiple molds from a single master.

Electroforming preserves finest detail of the original. We work from your metal or plastic patterns. Send print for quotation. Sample mold (medium size) from your pattern, $25. Write today.

PLATING ENGINEERING CO.

1928 South 62nd St. • Milwaukee 14, Wisconsin • Phone: EVergreen 4-4848

MANUFACTURERS See "ACCURATE" for Plastic Moldings

The manufacture of molded plastics and devices for military and industrial requirements are our specialties . . . hundreds of different parts are in present production.

COMPRESSION.....

PLUNGER-TRANSFER.....

SPECIALISTS IN SMALL RUNS USING HAND MOLDS

Considerate and experienced handling of your plastic molding problems is available thru ACCURATE SERVICE where you will find ample, modern facilities to meet your every plastic molding requirement . . . at MAXIMUM efficiency and economy.

SEND your specifications NOW! We invite toughest problems . . . NO OBLIGATION

ACCURATE MOLDING CORP. 35-20 — 48th AVENUE LONG ISLAND CITY 1, N. Y.

terials. It is erroneous, however, to compare the fatigue life of different materials except on the basis of equal stiffness and thickness.

A Test for High-Power D-C Arc Resistance of Electrical Insulating Materials. M. M. Fromm. ASTM Bulletin No. 207, 56-9 (July 1955). A test is described that measures the resistance of insulating materials, in sheet and tube form, to the formation of surface conducting paths when subjected to high-power arcs. Test conditions and results are reproducible and agree with results in actual service. Since this is a high-power arc test, it requires a power source of large capacity. The results of this test provide reliable information about high-power arc resistance of materials for design engineers. Results of tests with plastics are given.

A Laboratory Grinding Machine for Preparing Test Specimens From Rubber and Other Flexible Products. S. A. Eller and W. K. Gondek. ASTM Bulletin No. 206, 70-6 (May 1955). A high-speed, semiautomatic grinding machine is described for grinding rubber and other flexible materials into accurately dimensioned strip and cylindrical specimens suitable for use in conducting tension and stress relaxation tests. To keep the machine operating constantly at maximum efficiency and capable of grinding specimens with a minimum variation in dimensions, the machine was designed with a dressing device to maintain the abrasive surface of the grinding wheel constantly in parallel alignment with the other parts.

Publishers' Addresses

Aeronautical Engineering Review: Institute of the Aeronautical Services, Inc., 2 East 64th St., New York 21, N. Y.

ASTM Bulletins: American Society for Testing Materials, 1916 Race St., Philadelphia, Pa.

British Plastics: Iliffe and Sons, Ltd., Dorset House, Stamford St., London S. E. 1, England.

Canadian Plastics: Monetary Times Printing Co., Ltd., 341 Church St., Toronto 2, Ontario, Canada.

Der Plastverarbeiter: Kurt Brandeuburger, Klosterstrasse 182, Edenkoben/Pfalz, Germany.

Electrical Manufacturing: The Gage Publishing Co., 1250 Sixth Ave., New York, N. Y.

Industrial and Engineering Chemistry: American Chemical Society, 1115 Sixteenth St., N. W. Washington, D. C.

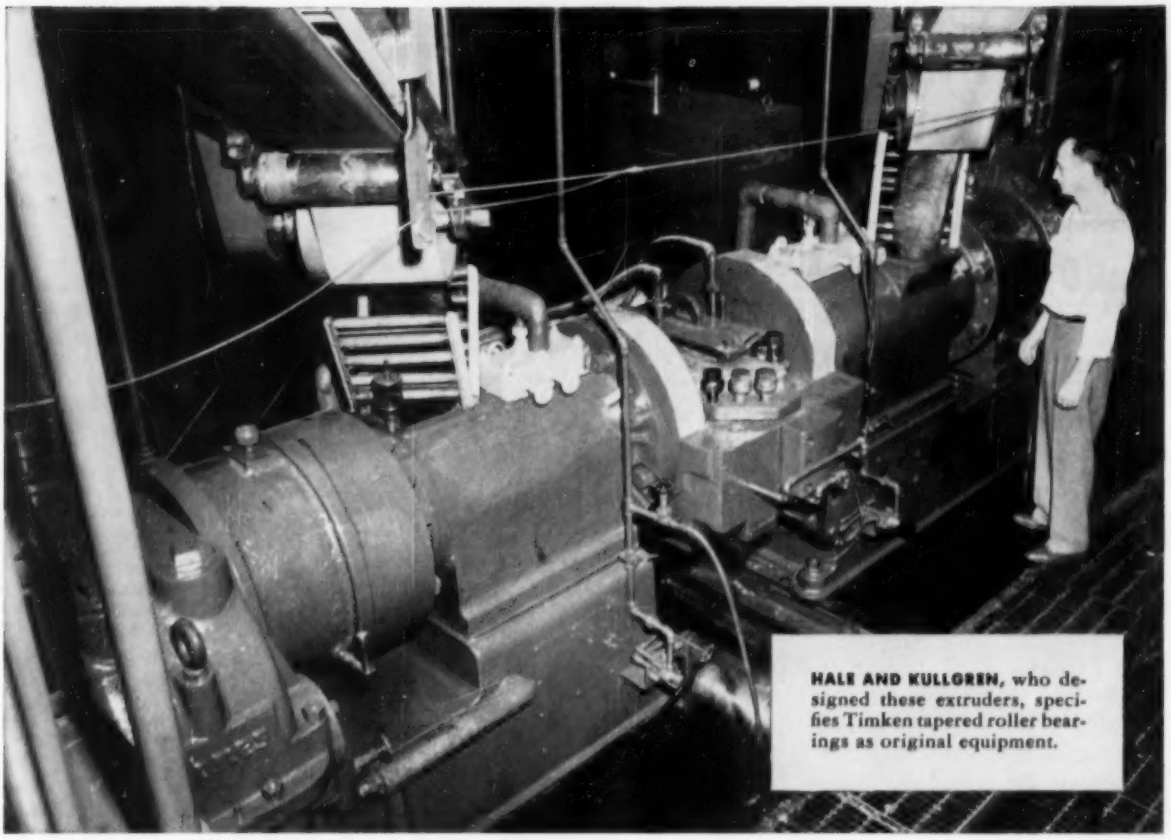
Institute of Marine Engineers, 85, The Minories, London E. C. 3, England.

Modern Packaging: Modern Packaging Corp., 575 Madison Ave., New York 22, N. Y.

Plastics (London): Temple Press Ltd., Bowling Greene Lane, London E. C. 1, England.

Plastics Technology: Bill Brothers Publishing Corp., 386 Fourth Ave., New York 16, N. Y.

Rubber and Plastics Age: The Rubber and Plastics Age, 147 Grosvenor Rd., Westminster, London S. W. 1, England.



HALE AND KULLGREN, who designed these extruders, specifies Timken tapered roller bearings as original equipment.

Outstanding proof that TIMKEN® bearings can take whopping thrust loads

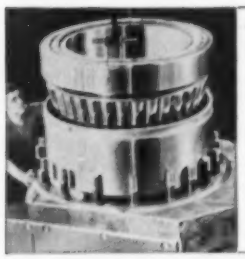
TWENTY-FOUR hours a day, year after year, these National Erie rubber extruders, redesigned by Hale and Kullgren, Incorporated, and built by Aetna-Standard Engineering Company, are kept in continuous operation.

Timken® tapered roller bearings are mounted on sleeves in the independent thrust units of these machines. As a result of their tapered construction, Timken bearings carry thrust and radial loads in any combination. Because of the tremendous thrust load encountered in this application, a large, steep-angle bearing was specified.

Nickel-rich Timken fine alloy steel, made in our own mills, is case-carburized to provide a wear-resistant surface over a tough, shock-resistant core. This results in longer bearing life and trouble-free performance under grueling conditions.

In no other bearing can you get the combination of advantages which Timken bearings give you. Specify Timken bearings in the equipment you build or buy. Look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



ROLL NECK BEARING ENGINEERING SERVICE

Our field and service engineers have had years of experience with problems of roll neck bearing design and operation. They'll help you select bearings and design mountings. Only Timken tapered roller bearings have these advantages: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. nickel-rich Timken alloy steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▱ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION ✳

U. S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

PHOTOGRAPHIC PROCESS. S. B. Elliott (to Ferro). U. S. 2,712,996, July 12. Photographic process using a light-sensitive resin.

LAMINATE. F. L. Johnson. U. S. 2,713,014, July 12. Composite laminate.

LAMINATE. A. C. Weiss. U. S. 2,713,016, July 12. Laminated fabric-base panel.

WELDING. C. N. Bruns (to Connecticut Hard Rubber). U. S. 2,713,-017, July 12. Welding plastic film.

ION EXCHANGE. G. J. DeJong (to Stamicarbon). U. S. 2,713,038, July 12. Sulfonium anion exchanger.

RESINS. L. E. Cadwell and J. C. Petropoulos (to American Cyanamid). U. S. 2,713,039, July 12. Modified alkyd resins.

RESINS. H. Z. Friedlander and W. A. Barber (to American Cyanamid). U. S. 2,713,041, July 12. Compositions of acrylamide.

POLYMERIZATION. H. F. Park (to Monsanto). U. S. 2,713,042, July 12. Polymeric adipoyl peroxide catalyst.

POLYMERIZATION. G. Daumiller (to Badische Anilin). U. S. 2,713,043, July 12. Polymerization of polystyrene.

POLYMERIZATION. R. E. McArthur and J. S. Logan (to Olin Mathieson). U. S. 2,713,044, July 12. Polymerization of ethylene.

BATTERY PLATE. J. E. LeGros and G. D. Smithwick (to D. B. Goin, M. Smithwick, and J. E. LeGros). U. S. 2,713,078, July 12. Plastic-sprayed battery grid.

CONTAINER. A. Strahm (to Uni-Tubo). U. S. 2,713,369, July 19. Thermoplastic container.

LAMINATING. M. A. Nadler and R. E. Medick (to North American). U. S. 2,713,378, July 19. Apparatus for laminating plastics.

PIPE COVERING. T. Kennedy (to Trenton). U. S. 2,713,383, July 19. Resinous pipe covering.

CONTAINER. C. A. Hirschberg. U. S. 2,713,436, July 19. Plastic container.

PACKAGE. L. Peters. U. S. 2,713,-544, July 19. Plastic food pacakge.

CELLULOSE ESTERS. R. F. Williams (to Eastman Kodak). U. S. 2,713,-546, July 19. Stabilized cellulose esters.

FUEL CELL. R. J. Reid and C. E. Best (to Firestone). U. S. 2,713,549,-50 July 19. Laminated fuel cell.

PIPE COVERING. T. Kennedy (to Trenton). U. S. 2,713,551, July 19. Glass-fabric reinforced resin pipe covering.

POLYMERS. R. J. Reid (to Firestone). U. S. 2,713,562, July 19. Ternary polymeric compositions.

PLASTISOL. L. B. Kuhn (to Firestone). U. S. 2,713,563, July 19. Vinyl plastisol containing inert filler.

SILICONE. C. W. Pfeifer and R. M. Savage (to General Electric). U. S. 2,713,564, July 19. Silicone rubber containing a metallic dialkyl dithiocarbamate.

VINYL COMPOSITION. H. W. Howard, C. V. Wittenwyler, and O. L. Nikles, Jr. (to Shell). U. S. 2,713,-565,-7 July 19. Composition containing polyvinyl acetal and a glycidyl polyether of a polyhydric phenol.

POLYMERS. R. J. Reid (to Firestone). U. S. 2,713,566, July 19. Ternary polymeric compositions.

STRIPPING. T. W. Fisher, Jr. and G. P. Rowland (to Firestone). U. S. 2,713,568, July 19. Stripping vinylidene-vinyl chloride copolymers.

EPOXY RESINS. S. O. Greenlee (to Devoe and Raynolds). U. S. 2,713,-569, July 19. Urea-epoxy compositions.

COPOLYMER. W. O. Kenyon, G. P. Waugh, and C. C. Unruh (to Eastman Kodak). U. S. 2,713,570, July 19. Vinyl acetophenone—maleic anhydride copolymer.

RESINS. L. B. Gordon and J. T. Kelly (to Pan American). U. S. 2,-713,571, July 19. Aromatic hydrocarbon—formaldehyde resins prepared with boron tri-fluoride catalyst.

COPOLYMERS. C. E. Schildknecht and M. L. Wallace (to Celanese). U. S. 2,713,573, July 19. Copolymers of acrylonitrile and N-lactams.

MOLDING. T. N. Willcox (to General Electric). U. S. 2,713,697, July 26. Molding machine for thermosetting plastics.

EXTRUDER. S. Danby, Jr., J. H. Ellett, A. P. Guess, and T. V. Williams, Jr. (to Du Pont). U. S. 2,713,-698, July 26. Wet polymer extruder.

MOLDING. R. W. Pooley (to U. S. Rubber). U. S. 2,713,699, July 26. Molding lightweight closed cell material.

CAPACITOR. J. H. Fisher (to Astron). U. S. 2,713,700, July 26. Molding sealed capacitors.

SEAM. G. A. Haugh. U. S. 2,713,-746, July 26. Forming a seam in thermoplastic objects.

ELASTIC STRUCTURES. H. G. Schwartz (to Du Pont). U. S. 2,713,-884, July 26. Polyester—diisocyanate structure.

PELLET. P. H. Seckel. U. S. 2,714,-076, July 26. Plasticized thermoplastic pellet.

RESINS. R. W. Martin (to General Electric). U. S. 2,714,098, July 26. Phenolic resin compositions.

POLYMERS. A. D. F. Toy and K. H. Rattebury (to Victor). U. S. 2,714,-100, July 26. Polymers of monochloromethanephosphonate.

POLYMERIZATION. J. L. Amos, J. C. Frank, and K. E. Stober (to Dow). U. S. 2,714,101, July 26. Bulk polymerization.

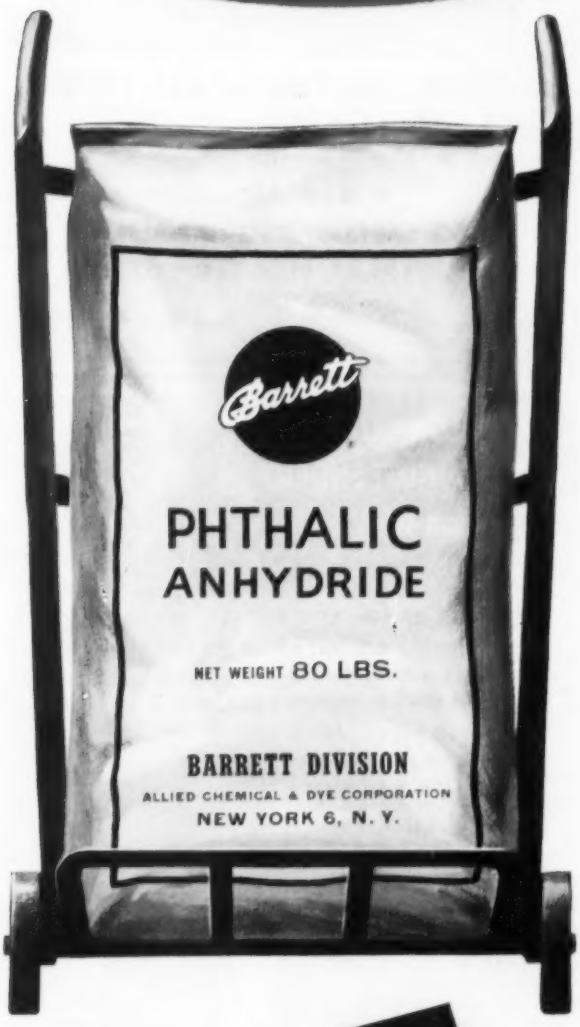
MOLDING PRESS. T. F. Stacy and E. J. von der Heide (to French Oil Mill Machinery). U. S. 2,714,225, August 2. Molding press.

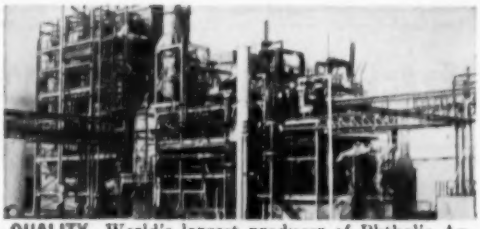
MOLDING. I. R. Axelrad (to Westinghouse). U. S. 2,714,226, August 2. Apparatus for molding plastics.

MINERAL WOOL. C. G. Landes (to American Cyanamid). U. S. 2,714,-

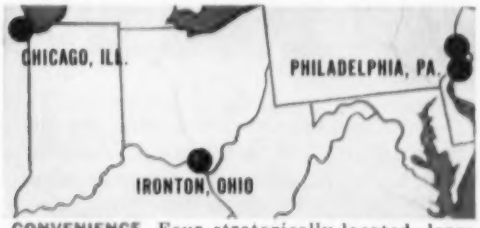
3 reasons why...

you get faster, better production if your PHTHALIC ANHYDRIDE supplier is BARRETT





QUALITY World's largest producer of Phthalic Anhydride and the Naphthalene it is made from, Barrett has the experience, basic position and the extras in production facilities that assure you a product of unsurpassed uniformity, purity and quality to meet your most exacting requirements.



CONVENIENCE Four strategically located, large modern plants in America's industrial heart-land—Chicago, Ironton (Ohio) and two in Philadelphia—assure the best possible service and quickest deliveries to Barrett Phthalic customers, whatever their needs may be.

TIME AND COST SAVINGS Ask for Barrett Phthalic Anhydride the way *you* want it! Barrett Phthalic comes in flaked form in 5-ply, 80-lb. paper bags. In liquid form, it is available in either tank trucks or tank cars. Or you may arrange unitized shipments to save handling time and costs at your end of the line.

ASK FOR YOUR COPY

Newly revised and up-dated, this Barrett Phthalic Anhydride booklet will be sent to you on request. Address Dept. 24K

Barrett

BARRETT CHEMICALS

BARRETT DIVISION, Allied Chemical & Dye Corporation, 40 Rector St., New York 6, N. Y. *In Canada:* The Barrett Company, Ltd., 5551 St. Hubert St., Montreal, P.Q.

Allied Chemical

OVER 100 YEARS OF EXPERIENCE

"Exact Weight" weigh feeders now offered on HPM injection molding machines

The Hydraulic Press Manufacturing Company, one of the largest manufacturers of injection molding equipment, now offers Exact Weight Weigh Feeders as either standard or optional equipment on many models.

Experience has proven that exact measurement by weight of each "shot" results in a more uniform product with less rejects and a great savings in material. This weigh feeder, developed by Exact Weight specialists in industrial weighing equipment, provides more accurate measurement than is possible with volumetric feed. Each charge is accurately weighed and automatically delivered to the machine. An extremely sensitive scale with visible indication and accurate adjustments allows operator to maintain constant control. Short and flash shots are prevented. You're assured of a more perfect product and less wear and maintenance on machines and molds.

Exact Weight Weigh Feeders are now available on many injection molders or can be quickly installed on your present machines. Write for complete details.

Sales and Service Coast to Coast

Exact Weight Scales

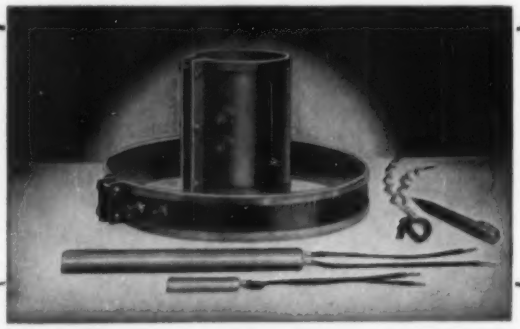
Better quality control
Better cost control

THE EXACT WEIGHT SCALE COMPANY

919 W. Fifth Avenue, Columbus 8, Ohio
In Canada: P.O. Box 179, Station S, Toronto 18, Ont.

HEAT FOR PLASTIC PROCESSING

You specify the size



ELECTRIC HEATERS of ALL TYPES

- For Machine Parts
- For Liquids
- For Air

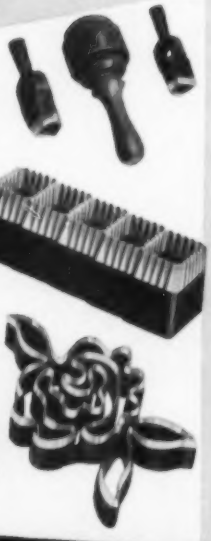
ALSO SPECIAL REQUIREMENTS

INDUSTRIAL HEATER CO., INC.
1921-1955
245 Canal St. New York 13, N. Y.

PRECISION CUTTING DIES by INDEPENDENT and NEW ERA

Exact dies for every conceivable purpose:
• CLICKER • MAUL HANDLE
• PUNCH PRESS • WALKER

Distributors for:
Pales Clicker Machines and Seelye Beam Die Presses . . . Hard Maple and Composition Die Blocks and Pads . . . Raw Hide Mauls



INDEPENDENT DIE & SUPPLY CO.
2687 La Salle Street • St. Louis 4, Missouri
ASSOCIATE: NEW ERA DIE CO., YORK COUNTY, RED LION, PA.

276, August 2. Mineral wool impregnated with an epichlorohydrin resin.

VENETIAN BLINDS. J. L. Hunter and T. A. Martin (to Hunter-Douglas). U. S. 2,714,413, August 2. Plastic venetian blind ladders.

PIPE. C. de Ganahl, J. A. Grant, and C. E. Bacon (to Owens-Corning). U. S. 2,714,414, August 2. Glass fiber-plastic pipe.

PACKING. R. A. Mahaffy (to Standard Packaging). U. S. 2,714,557, Aug. 2. Vacuum-packaging with polyethylene.

COATED SHEET. W. H. Sheffield, K. W. Koeniger, and C. B. Hemming (to U. S. Plywood). U. S. 2,714,559, August 2. Coated plastic

WRAPPING. J. F. Hechtman (to Munising). U. S. 2,714,562, August 2. Self-sealing wrapping.

COATING. C. E. Irion and K. E. Prindle (to Dobeckmun). U. S. 2,714,571, August 2. Bonding polyethylene film to a fibrous web.

FILLERS. F. Kuster. U. S. 2,714,584, August 2. Colloidal asphalt fillers for plastics.

SILICONES. M. C. Agens (to General Electric). U. S. 2,714,585, August 2. Curing silicone resins with aluminum crotonate.

BONDING. A. A. Meyer (to Warner Electric Brake). U. S. 2,714,746, August 9. Bonding plastic to metal.

SHOES. A. E. Murray. U. S. 2,714,770, August 9. A shoe of set plastic materials.

POLYETHYLENE. L. E. Wolinski (to Du Pont). U. S. 2,715,075-6-7, Aug. 9. Ozone treatment of polyethylene.

CELLULOSIC MATERIAL. O. P. Cohen (to Monsanto). U. S. 2,715,078, August 9. Impregnating cellulosic material with thermosetting resin.

TUBING. G. Barradas (to P. M. Industries). U. S. 2,715,087, August 9. Sealing a thermoplastic tube.

COATING. J. R. Gunning (to Provincial Paper). U. S. 2,715,088, Aug. 9. Coating paper with thermoplastic resins.

ACRYLONITRILE. G. W. Stanton and F. A. Ehlers (to Dow). U. S. 2,715,112, August 9. Acrylonitrile polymers stabilized with the use of glycol ethers.

COLOR

WITH.... Unicolor

SAVES MONEY • SAVES TIME

Coloring your plastics with UNICOLOR is as simple as placing material in your present equipment.

UNICOLOR, the revolutionary resin color concentrates eliminate production delays, increases equipment capacity, reduces inventory losses and costs.

Works perfectly in your present equipment, absolutely no changes necessary in material or equipment. It will not fly and contaminate other machines, will not clog screens.

You can get UNICOLOR to meet your most exacting color requirements . . . brilliant, bright, metallic or soft pastel shades. Available in granulated or pellet form.

Write today for information on how you can Cut Color Costs, how to handle special color problems, and how UNICOLOR simplifies your color problems.

CUSTOM COMPOUNDERS OF THERMOPLASTIC MATERIALS

WESTCHESTER PLASTICS

WESTCHESTER
PLASTICS, INC.
326 Waverly Avenue, Mamaroneck, New York

NEW MACHINERY AND EQUIPMENT

Injection Molding Machine—Model 300-H-12 is a 12- to 16-oz. machine with an injection speed of 1150 cu. in./min.; a mold mounting area of 30 by 20 in.; and a 20-in. mold clamp stroke. The machine can be furnished for semi-automatic or fully automatic operation. Compensating-type weigh feeder is optional.

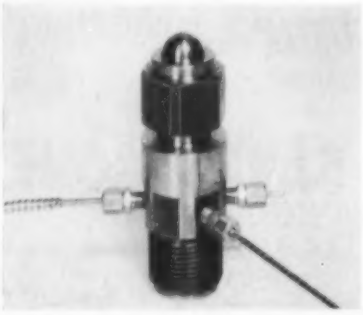
Plasticizing capacity (polystyrene) is 135 lb./hour. The plasticizing chamber is equipped with three heat zones, each pyrometer-controlled. Heating bands are mounted directly on the spreader.

The all-hydraulic injection unit is retractable for purging and die setting. The injection nozzle is hydraulically loaded, and a hydraulically actuated positive sprue break can be used at the option of the operator.

The injection pump permits dual pressure injection, which permits the injection pressure to be reduced automatically during cooling portion of cycle.

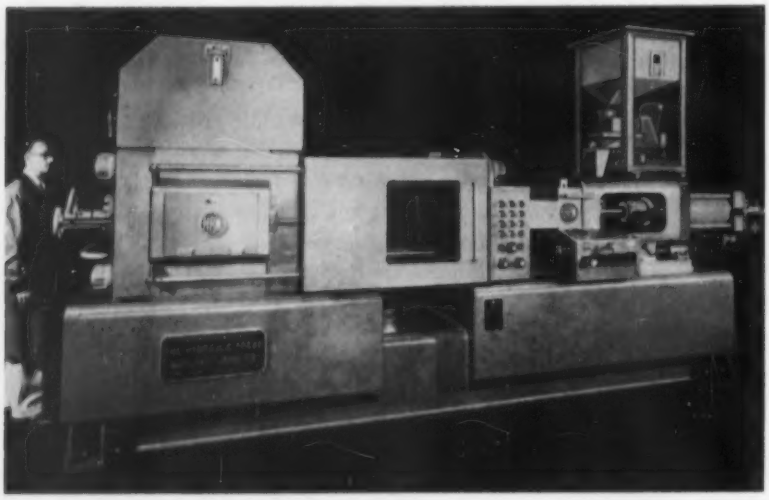
A straight-line, fully hydraulic mold clamp has automatic adjustable slow-downs prior to mold contact, at mold break-away, and during ejection of the molded part. All electrical controls are housed in one panel. *The Hydraulic Press Mfg. Co., Mount Gilead, Ohio.*

Test Nozzle—Designed primarily for rating injection machine capacity in ounces and pounds per hour, a new thermocouple-type test nozzle is engineered according to S.P.I.-General Motors specifications. The nozzle, in which an exposed thermocouple can be suspended in the hot flowing plastic material, is also claimed to offer molders new heater control versatility. An external couple permits checking differential between nozzle temperature and actual material temperature.



Injection Molders Supply's test nozzle has exposed thermocouple that can be suspended in hot plastic

Test nozzles are stocked for all Stokes, IMS, and Reed-Prentice heaters using 1¾-in.-8 nozzle thread. The manufacturer states that test nozzles for all HPM, Watson-Stillman, Lester, Impco, De Mattia, Lewis, and other types of heating cylinders are promptly made to order. *Injection Molders Supply Co., 3514 Lee Rd., Cleveland, Ohio.*



Hydraulic Press' Model 300-H-12 injection molding machine has an injection speed of 1150 cu. in./min., and a plasticizing capacity of 135 lb./hr. (polystyrene)

Slitter-Rewinder—Available in 40-, 50-, and 60-in. sizes, this slitter-rewinder is designed for use by converters of plastics film. Controls for starting, stopping, tension adjustment, acceleration, and infinite speed variations are arranged for easy access by the operator. Shear-type cutters are spring loaded. The machine incorporates an automatic web guide, static eliminator, and blower-type trim remover with receptacle. *Hobbs Mfg. Co., 311 Salisbury St., Worcester, Mass.*

Printing Machine—Model 70AF printing machine is intended for imprinting variable data (color, batch number, content, etc.) directly on lithographed or preprinted cans or other cylindrical containers, to replace paper labeling and reduce inventories of fully lithographed containers. The machine accommodates cans ranging in capacity from 1/32 to 1 gallon. Operating speed is up to 1500 imprints per hour. Maximum imprint area is 2 by 6 inches.

Imprinting is done as a sliding carriage, which holds the container, is moved from right to left. After imprinting, the container is manually removed or ejected onto a conveyor. The printing element, which is inked as the carriage returns to the right, consists of insertable type or a rubber plate, which can be changed to meet imprinting requirements. *Markem Machine Co., Keene 52, New Hampshire.*

Vacuum Forming Machines—Model PEX twin vacuum forming machine has a mold area measuring 48 by 72 in. and can be operated automatically, semi-automatically, or manually. Twin tables allow com-

MODEL
H-250

Step Up Production with VAN DORN 2½ Oz. Automatic Press

Check these outstanding features of this ultra-modern Van Dorn injection press:—

GREATER CAPACITY— Up to 2½ oz.; smaller pieces at faster cycles.

HI-SPEED PERFORMANCE— Plasticizes material at 22 lbs. plus per hour.

FASTER PRODUCTION—Will attain up to 720 cycles per hour (dry run).

HIGHEST EFFICIENCY—Due to water cooling of injection plunger, transfer hopper and oil cooler.

ACCESSIBILITY— Due to simple platen clamp device for purging to change material or color.

MORE SAFETY— Mold hydraulic mechanism makes press non-operative unless molded part is completely ejected.

SIMPLER OPERATION—Due to automatic, adjustable material metering device.

MULTIPLE OPERATIONS— Minimum operator attention by use of larger hopper and light that indicates when press needs attention.

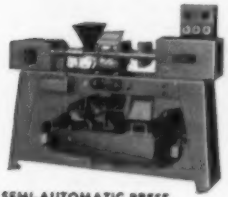
SELECTIVE CONTROL—Merely throw toggle switch to operate press semi-automatically.

DEPENDABILITY— Because of all-steel construction and Van Dorn's established reputation in the plastics machinery field.

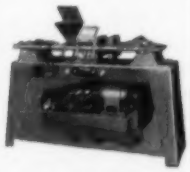
THE VAN DORN IRON WORKS CO.
2687 East 79th Street • Cleveland 4, Ohio
Cable Address: "VANDORN" Cleveland

and this Van Dorn model is the lowest priced press in its class!

Write for complete data on Model H-250 and other equipment shown. FINANCING AVAILABLE



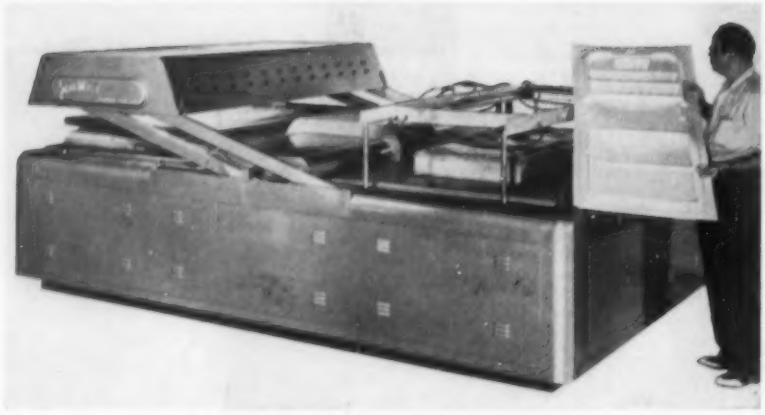
SEMI-AUTOMATIC PRESS
2-oz. capacity.



POWER OPERATED, LEVER CONTROLLED PRESSES
2-oz. and 1-oz. models

PLASTIC GRINDER
Grinds up rejects, waste, etc., for re-use.

MOLD BASES
Available from stock.



Comet Industries' Model PEX vacuum forming machine is designed with twin tables that permit different forming operations and cycles to proceed independently at each table

pletely different operations and cycle times to proceed independently at each table. Water- and air-cooled frames are available. The machine has built-in pump and tank.

This forming unit is designed for production of large parts, such as refrigerator door liners and similar items. *Comet Industries, Franklin Park, Ill.*

Temperature Controller—An improved model stepless temperature controller modulates power input to an electrical load, so that heat input is only equal to heat loss. This is accomplished without use of contractors (common with conventional on-off systems). This instrument automatically will vary power input-to-load between 3 and 90%, according to requirements. *West Instrument Corp., 4359 W. Montrose Ave., Chicago, Ill.*

Steam Trap—Inverted bucket steam trap, designated model B1-X, is a relatively small unit with high discharge capacity. Theoretically, discharge capacity is a function of valve size; the larger the valve, the higher the capacity. In practice, however, considerable force is needed to open large valves against steam pressure. Model B1-X is said to provide such force through a mechanism designated as Camlift.

The valve operates as follows: When sufficient steam leaks through a bucket vent, the bucket loses buoyancy and sinks. The weight of the bucket then pulls on the far end of the bucket arm which acts as a lever to pry the valve head off the seat where it is held by the steam pressure. Cams on the Camlift serve as fulcrum points and multiply this lever force, and the valve head is lifted immediately from its seat. A slot in the Camlift then permits the valve head to drop away from the seat, leaving the seat wide open for maximum discharge. This bucket steam trap design is reported to prevent loss of prime. *Sarco Co., Inc., Empire State Bldg., New York 1, N. Y.*

Wiper Ring Adapter—The Hydro-Wype Scraper Ring Adapter is claimed to permit the installation of scraper rings in the field and on the job with a minimum of down time. Use of scraper rings on hydraulic and pneumatic systems prevents dirt, dust, and abrasive materials from damaging the reciprocating mechanism. The adapter consists of a front retainer plate and a back plate and is used with the Hydro-Wype scraper ring placed between the two. *Associated Technical Sales Co., 4217 N. Main St., Dayton 5, Ohio.*

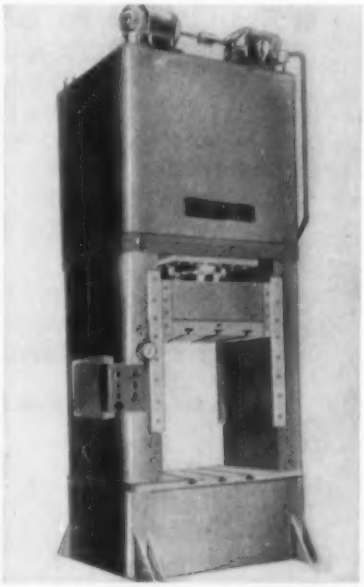
Heat Sealer—Model 5440 semi-automatic heat sealer with single sealing length of 40 in. contains an automatic tripping device that controls the heat-sealing cycle. No foot or hand switches are required; preliminary hand settings control heat, time, and pressure. Seal width is variable from ¼ to 1 inch. An elongated O-ring sealed air piston is said to produce uniform pressure through the area of the seal. All controls are integral and include "on" and "off" switches, electric reset counter, air pressure regulator to control sealing bar pressure; preset dwell timer adjustable from 1 to 15 sec. in ¼-sec. increments; and adjustable thermostat control to regulate the heater bar.

Heater bar is coated with Teflon to eliminate sticking of vinyl- or polyethylene-coated sealing materials. Feed table may be tilted to accommodate bulky packages.

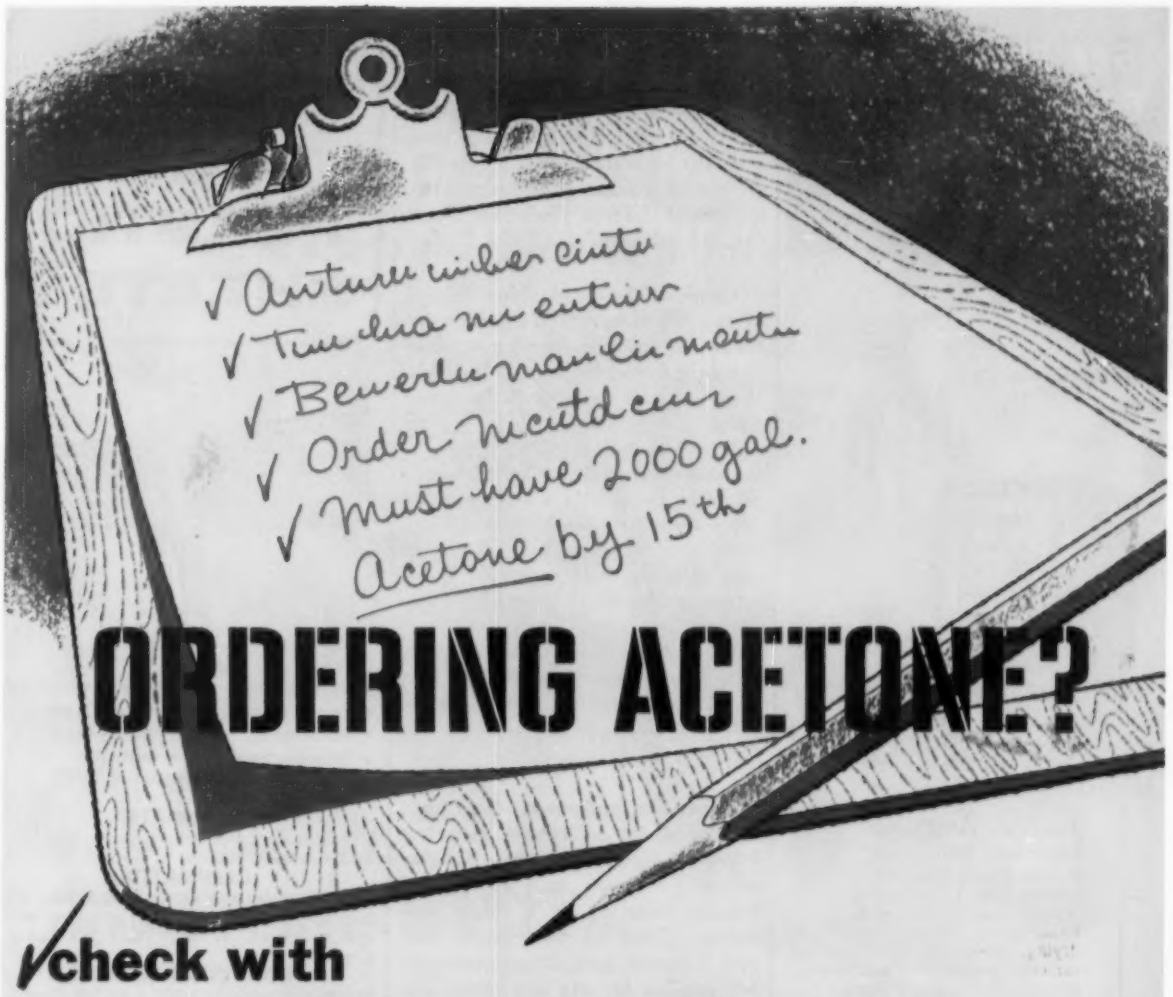
Model 5440 is 42 in. long, 13 in. deep, and 13½ in. high; weight is 80 lb.; it operates on 110-v. 60-cycle alternating current. *Product Packaging Engineering, 5747 Marilyn Ave., Culver City, Calif.*

Guiding Unit—Automatic let-off guiding unit is said to assure evenly wound rolls of plastic, cloth, or paper. When set to the line of the selvage or edge of travel, a sensing device actuates the automatic guiding unit electrically, which in turn moves the carriage to keep the material running straight and smooth. *Hermas Machine Co., Warburton Ave., Hawthorne, N. J.*

Hydraulic Press—Model SF 300 double-action hydraulic press is electrically controlled for either automatic or semi-automatic operation. Slide return may be controlled by either pressure or length-of-



Clifton Hydraulic's Model SF 300 is electrically controlled for automatic or semi-automatic operation


✓ Another rubber cinch
✓ Time has no entrance
✓ Beverly man in mouth
✓ Order needed soon
✓ Must have 2000 gal.
Acetone by 15th
ORDERING ACETONE?

✓check with SHELL CHEMICAL first

Strategically located bulk depots assure prompt deliveries. Save money on multi-solvent shipments via compartment tank cars and trucks

WHEN YOU make Shell Chemical your headquarters for acetone and other solvents, you automatically have fewer supply worries.

You need never give *purity* a second thought, because Shell Chemical maintains quality-control standards that are among the industry's highest—all the way from the plant to your door.

You will find, too, that Shell Chemical is a dependable source, whether your needs are reckoned in drums or tank cars. Bulk storage depots are within convenient shipping range of every large industrial center . . . as close as your 'phone!

And you can keep costs low by taking full advantage of bulk prices available through compartment tank car and truck deliveries. Order several solvents at a time, and watch costs go down!

• • •

Place that next acetone order with Shell and you'll agree with thousands of other customers, small and large, that Shell is your dependable source! Write for the catalog SC:54-40 on Shell Chemical solvents.

SHELL CHEMICAL CORPORATION
CHEMICAL PARTNER OF INDUSTRY AND AGRICULTURE
380 Madison Avenue, New York 17, New York

Atlanta • Boston • Chicago • Cleveland • Detroit • Houston • Los Angeles • Newark • New York • San Francisco • St. Louis
IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited • Montreal • Toronto • Vancouver

SEE ERDCO FOR FAST, LOW COST ELECTRONIC HEAT SEALING

NEW Sealing Press

NEW Dielectric Generators 1 to 50 KW

Accurately rated for continuous heavy duty

Industrial pre-heating and plastic sealing. Ideal for packaging, food processing, dehydration, deinfestation and instantaneous drying. Extensively developed and tested. Constructed of best quality components for fast, uniform, dependable production at minimum cost. With or without automatic load matching and frequency stabilizing equipment. Power can be easily controlled to meet your requirements.

ELECTRONIC GENERATORS — ERDCO — HI FREQUENCY EQUIPMENT

102-55

ERDCO ENGINEERING CORP.

Engineering-Research-Development

Qualified representatives wanted for few choice areas.

ERDCO ENGINEERING CORP.
Dept. MP, Addison, Ill., TErrace 4-1849

Please send full information on ☐ ERDCO Dielectric Generators
☐ ERDCO Crystal Controlled High-Frequency Generators
☐ ERDCO Sealing Press
☐ Please have an ERDCO engineer call, without charge or obligation to us.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

stroke setting. The press may be operated manually when the slide is in the "up" position. Pump by-passes at zero pressure.

The press is available in capacities of 50, 100, 150, 200, and 300 tons, and may be built to meet practically any speed, stroke, or platen size requirement. *Clifton Hydraulic Press Co., 284 Allwood Rd., Clifton, N. J.*

Vacuum Forming Machine—Model 20 is a laboratory-type machine for drape and vacuum forming of plastics sheet from 0.003 to 0.125 in. thick. It can also be used for "skin packaging."

A centrifugal vacuum pump, motor, and surge tank are built into the machine. Oven height and depth of drape are adjustable. Heater rods are located in reflector-type ovens to give optimum heating cycles. Oven pivots to side, keeping heat from operator's face.

The machine is said to drape up to 6 in. deep with maximum sheet size of 14 by 14 inches. *Abbott Plastic Machine Corp., 6322 N. Clark St., Chicago, Ill.*

Dispensing Equipment—Gear train developed for a line of metering pumps is reported to make possible delivery of more than 300 c.c. of viscous materials in a single discharge. Using standard gears, several hundred quantity adjustments are possible for any one pump. The equipment finds use in filling jars, bottles, squeeze tubes, etc., as well as in sealing, potting, and cementing. *Edward E. Robinson, Inc., 95 Park Ave., Nutley 10, N. J.*

Conveyor Belts—Moto-Belt, a horizontal belt conveyor for production, assembly, inspection, and packaging operations, is available in lengths up to 80 feet. Frames are constructed of aluminum, steel, or stainless steel in 10-ft. sections, permitting adjustment of conveyor system length by addition or removal of these sections. Frame depth in work area is 2½ inches. Frames are made in three standard widths: 12, 15, and 21 inches.

Belts are of cotton, canvas, rubber, plastics, or wire mesh from 2 to 18 in. wide. Belt speeds can be fixed or variable. Standard drive is by electric motor and speed reducer. *New London Engineering Co., 1700 S. Division St., New London, Wis.*

Does your Product Require

RIGID PLASTIC SHEETS?

- corrugated
- reinforced
- laminated
- transparent
- press polished
- translucent
- embossed
- opaque

High & low impact P.V.C.
Sizes to 51" x 108"

CORRUGATED
For architectural construction, displays and decorative trim

LAMINATED
Including decorative materials like Fiberglas, wire screen, fabric, paper and many others. Widely used for lampshades

HIGH COMPRESSION
Up to 50" wide and 72" long, of phenolic, silicone or esters

REINFORCED
Built-up sheets of unusual strength and thickness. Up to 3½" thick in polyethylene

PRESS POLISHED
Smooth flaw-free surfaces. Good optical properties when transparent

EMBOSSED
A variety of interesting colors and effects

CLARITY
Transparent, transulcent and opaque
COLORS ON REQUEST

SHEETS and ROLLS IN STOCK

Vinylite	acetate
polyethylene	Plexiglas
modified styrene	butyrate
high & low impact P.V.C.	

No matter how unusual your specifications may be . . . we meet them precisely. Let us know what your requirements are.

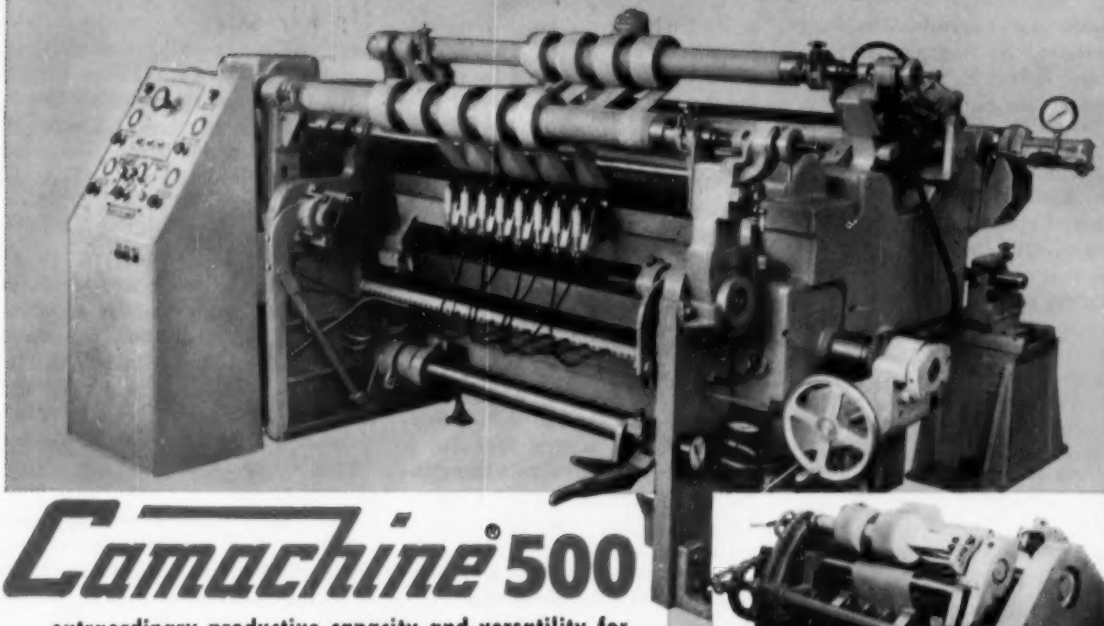
SCRANTON PLASTIC LAMINATING CORP.

3218 PITTSTON AVENUE
SCRANTON 6, PENNSYLVANIA

for speed, accuracy, economy in

FILM SLITTING

there's a Camachine to meet every need



Camachine® 500

extraordinary productive capacity and versatility for true economy plus top-quality slitting and winding

The following two features of the new 500 give you unmatched versatility:

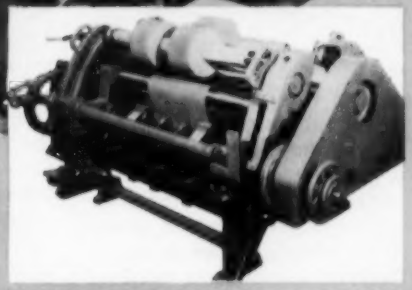
(1) FLEXIBILITY—quick changeover from one slitting method to another including score-cut, shear-cut, razor-cut, burst-cut, or SEALCUT® for fusing. **(2) REWIND QUALITY**—ultra-sensitive automatic rewind density control, to assure exactly the softness or hardness you need without stretching, snap-off or slack while running.

With this *flexibility* and *rewind quality* you can produce, *on one new 500,* top-quality rolls of light, heavy, stretchy or rigid plastics; laminates of all types; waxed or coated papers; kraft; foil; impregnated fabrics and other materials.

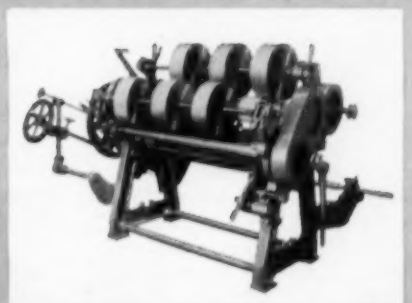
Camachine 500 specifications include: trim widths up to 72″; finished rolls up to 20″ dia.; speeds to 2000 fpm*. Write for Bulletin 1050.

*Speed is dependent on machine width and character of products.

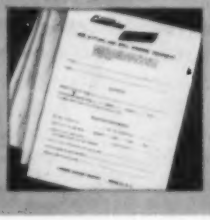
AA-307



TYPE 28—For medium or heavy gauge plastic films. Rated at speeds up to 800 fpm*. Choice of score-cut or shear-cut slitting; combination surface and center rewinding; positive roll separation.



TYPE 26—For light to medium gauge plastic films. Rated at speeds up to 500 fpm*. Score-cut; razor-cut or SEALCUT for fusing. Built in trim widths from 26″ to 62″.



CAMACHINE DATAFORM. Use this simplified form to get a prompt recommendation on the right equipment for your roll production job. Write today for your copy of the Dataform.

CAMERON MACHINE COMPANY • 61 POPLAR STREET • BROOKLYN 1, N. Y.

BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery.

"Plastics for Corrosion-Resistant Applications," by Raymond B. Seymour and Robert H. Steiner

Published in 1955 by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 423 pages. Price: $7.50.

This volume supplies engineers with background information on the selection of plastics for construction use in corrosive atmospheres.

Following an introductory chapter and a short history of plastics materials of construction, there is a description of the relationships between the chemical and physical properties and the molecular structure of plastics. Succeeding chapters deal with the use of plastics as protective coverings, chemical-resistant mortar cements, casting resins, foams, impregnants, industrial adhesives, and reinforced materials. Other sections describe plastics pipe, ductwork, valves and fittings, and the use of plastics for corrosion-resistant floors, sumps, and processing vessels.

Comparative data on the chemical resistance of coatings, linings, pipes, and structures are presented in detail. The final chapter gives, in tabular form, a plastics selection guide.

"Principles of Mass and Flow Production," by Frank G. Woolard

Published in 1955 by Philosophical Library, Inc., 15 E. 40th St., New York 16, N. Y. 195 pages. Price: $7.50.

Flow production, frequently thought of as being suitable only for large and highly organized enterprises, can be applied profitably to small-quantity output by small firms, according to the author of this book.

After defining the terms "mass production" and "flow production," the author briefly traces the history of "flow production." He then lays down 18 basic principles, and considers the implication of each in detail. The principles and methods described are claimed to be suitable for all types of mass-production.

The book also deals with some of the practical problems arising from the increasing use of automation, and a chapter is devoted to the automatic factory of the future. Throughout, the text is supplemented by photographs and diagrams of actual flow production set-ups.

"Developing and Selling New Products"

Published in 1955 by U. S. Dept. of Commerce and available through Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. 105 pages. Price: $0.40.

Stated purpose of this second edition of a handbook originally published in 1949 is to assist manufacturers in reducing the financial and other risks involved in the development and sale of new products. It seeks to describe in simple terms the steps that may be taken by manufacturers to meet the more common problems that arise in planning new-product development and marketing programs. The following topics are covered: locating ideas for new products, selecting the right product, getting the product ready for the market, naming the product, packaging the product, and planning a marketing program. Case studies of new product marketing and a summary of government aids available for new product development and marketing are also presented.

Christmas merchandising — Eight-page catalog presents a line of displays, some of them as large as 5 ft. high, for merchandising use during the Christmas season. Most of the displays are vacuum formed of vinyl sheet; included are animated circus animals, plaques, peppermint stripe canes, Santa Claus figures, clowns, and similar items. Each display is described as to material, size, decoration, and price. *W. L. Stensgaard and Assoc., Inc., 346 N. Justine St., Chicago 7, Ill.*

Inventor's manual—Titled "Progress Through Invention," this 28-page booklet contains reprints of talks given at the first Invention Exhibit & Conference held by the Cleveland Engineering Society. Topics covered include how to invent, how to patent, and how to sell. $1.00. *Cleveland Engineering Society, 2136 East 19th St., Cleveland 15, Ohio.*

Rotary files—Sixteen-page catalog of rotary files for plastics, hard and soft metals, wood, and other materials includes chisel cut, ground-from-the-solid and tungsten-carbide rotary files, as well as countersinks and rasps in a range of sizes, shapes, and cuts. Photographs of all files in actual size are included. A series of plastic-boxed sets is also illustrated and described. *Grobet File in America, Inc., 421 Canal St., New York 13, N. Y.*

Thermocouple protectors—Bulletin 11-13 catalogs a line of standard thermocouple protecting tubes and protecting wells. Specifications, application data, and ordering and price information are included. *Claud S. Gordon Co., 3000 S. Wallace St., Chicago 16, Ill.*

Corrosion protection — Four-page folder lists applications for volatile corrosion inhibitor paper in packaging, maintenance, and plant cleanliness and safety. *Cromwell Paper Co., 4801 S. Whippel St., Chicago 32, Ill.*

Chlorinated solvents—Technical bulletin reviews a complete line of specialized chlorinated solvents. Products discussed are methyl chloride, methylene chloride, chloroform, carbon tetrachloride, and perchloroethylene. For each of these materials the following data are provided: description, physical properties, typical shipping analysis, major uses, handling precautions, and size of containers for shipment. *Diamond Alkali Co., Chlorinated Products Div., 300 Union Commerce Building, Cleveland 14, Ohio.*

Epoxies—Resin selection chart gives data on a line of epoxy resins for impregnating, insulating, and potting. The chart is divided into three sections—room-temperature, moderate-temperature, and moderate-high-temperature curing systems. For each resin, information on resin-hardener ratios, initial viscosity, average pot life, average cure time,

Announcing 1956 Koppers Design Competition

FOR EXCELLENCE OF CREATIVE DESIGN IN PLASTIC HOUSEWARES

PURPOSE OF KOPPERS DESIGN COMPETITION

To actively support the "Statement of Principles by the Plastics Industry" by fostering good design and the proper application of polystyrene and polyethylene in plastic housewares.

WHO CAN ENTER?

All proprietary molders, extruders and fabricators are invited to enter examples of their newest polystyrene and polyethylene housewares in the Koppers Design Competition. So that entries will compete with other housewares of the same nature there will be four separate classes in the competition. A First Prize and an Honorable Mention Award will be made in each class. In addition, a Best-Of-Competition Grand Prize winner will be selected.

TOP AWARDS— DESIGN SCHOLARSHIPS

For the Best-Of-Competition winner Koppers will grant, at a qualified college or university of the molder's choice, a two-year, full-tuition scholarship for studies related to product design. To the 4 First Prize winners Koppers will award . . . one-year product design scholarships on the same basis.

Each Scholarship will be named in honor of the winning molder. It will be awarded to a qualified student selected by the college or university.

Winning products, announced at an Awards Banquet in Pittsburgh on March 14, 1956, will be displayed and merchandised as part of a nation-wide promotion directed to the buyers of housewares.

NOTED PANEL OF JUDGES

Raymond Loewy Associates
Industrial Design Consultants

•

Jesse H. Day, Ph.D.
Editor of S.P.E. Journal
Member of Society of Plastics Engineers

•

Hugh G. Wales, Ph.D.
Professor of Marketing, University of Illinois.
Secretary of the American Marketing Association.

BASIS FOR JUDGING

1. Imaginative use of polystyrene or polyethylene in housewares.
2. Proper application of polystyrene or polyethylene.
3. Apparent market potential.

For entry forms and more information, contact any Koppers Plastics representative or write to Administration Committee, Koppers Design Competition, 1301 Koppers Building, Pittsburgh 19, Pennsylvania.

KOPPERS DESIGN COMPETITION

PLASTIC MOLDS
FROM THE SMALLEST TO THE LARGEST

TUBE CAPS . . . TYPICAL OF SMALL AUTOMATIC, INTRICATE MOLDS

Eagle Tool is completely equipped with machining and handling facilities for the best in mold design and construction, from the smallest, most complicated molds to the largest injection molds.

•

COMPLETE FACILITIES IN DESIGN AND CONSTRUCTION OF INJECTION COMPRESSION, TRANSFER, PLUNGER AND LOW PRESSURE MATCHED MOLD APPLICATIONS.

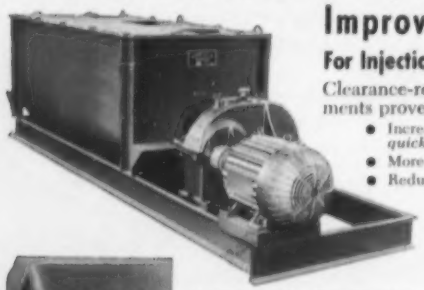
EAGLE TOOL AND MACHINE CO.

EVANS TERMINAL ROAD, HILLSIDE, N. J.

Telephones: ELizabeth 4-1515-16

SINCE 1918

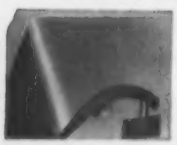
AMAZING NEW
BAILEY
BLENDER ELEMENT
Specially Developed For Mixing Vinyl Scrap Or Virgin Plastics



Improves Pre-Plasticizing!
For Injection Molding • Extruding • Calendering

Clearance-relieved ribbon segments on mixing elements proves far superior to all double ribbon mixers.

- Increases blending efficiency, makes a *better* mix *quicker.*
- More thorough emptying of blender—faster cleanup.
- Reduces maintenance costs.

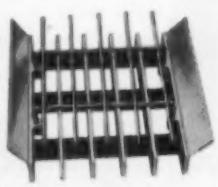


ROUNDED CORNERS for quicker, more complete cleaning—eliminates contamination between batches.

Write today for literature giving full details of Bailey New superior Blenders, Sifters, Cutters, Shredders, Batch Dumpers and other fine Bailey equipment used by such companies as: Monsanto, American Cyanamid, Borden, Resiloid, Chas. Field, Gering Products, and many others.

MAGNETIC GRATE SEPARATOR
PREVENTS UNNECESSARY DAMAGE TO EQUIPMENT

The Magnetic Grate consists of highly saturated permanent type Alnico No. 6 magnets and intervening steel bars.
Placed in the throat of the hopper, the grate attracts every ferrous object from material being loaded in the machine. Retaining this and other large debris of all kinds—rags, sticks, stones, paper, etc., it helps prevent damage to expensive machinery.
The grate can readily be lifted out for removal of tramp iron and debris. The Magnetic Grates are available in sizes from 2" x 4" up to 8 feet square. Any size or shape can be furnished to meet unusual requirements.



R. N. BAILEY & CO., INC.

11 W. 42nd St.
New York 18, N. Y.

average hardness, and heat-distortion temperature is given. *Furane Plastics, Inc., 4516 Brazil St., Los Angeles 39, Calif.*

Insulation materials—General catalog of flexible electrical insulation materials is a compilation of technical data sheets on coated products, varnishes, and plastic products. Included are several charts and conversion tables. A complete listing of sales representatives throughout the United States is also presented. *Irvington Div., Minnesota Mining & Mfg. Co., Irvington, N. J.*

Industrial fibers — Four industrial fibers produced from redwood and redwood bark are described in illustrated Bulletin F-114-1. The fibers are used in large commercial quantities as filtering agents, ceramic burn-out fillers, thermal insulation, reinforcement in molded products, furniture and toy stuffing, textile blends, and other applications. Physical and chemical properties are listed and potential applications outlined. *The Pacific Lumber Co., 100 Bush St., San Francisco 4, Calif.*

P.V.A. film—Sixteen-page brochure lists properties and end-use applications for polyvinyl alcohol film. Specifications of a line of such films, as well as price and ordering information are included. *Mono-Sol Corp., 407 County Line Rd., Gary, Ind.*

Resorcinol resins — Sixteen-page pamphlet describes a group of resorcinol resins, including Synvaren PLS-R, claimed to be suitable for replacing resorcinol-formaldehyde dip solutions used with latex in the treatment of rayon and nylon for subsequent adhesion to rubber. Applications of several resorcinol-phenol-formaldehyde resins in the woodworking industry and in bonding a variety of surfaces are also described. *Synvar Corp., Wilmington 99, Del.*

Mixers—Bulletin R-1701-B1 explains the major aspects to be considered when buying large mixers for chemical and other industrial applications. Information is included on correct mixing action, uniformity of batches, conversion to automatic batch operation, importance of dustproof operation, maintenance and repair costs,

and required installation space. An outline drawing illustrates a typical mixer, and a chart lists models of various capacities, together with their dimensions. *Worthington Corp., Harrison, N. J.*

Steel—Guide to specialty steels defines their distinctive characteristics in terms of end use. It covers tool and die steels; stainless steels; valve, heat-resistant, and super-alloy steels; silicon and high-nickel electrical alloys; special-purpose alloy steels; and tubing, pipe, and wire. Information is given on quality control in specialty steel production. *The Carpenter Steel Co., 312 W. Bern St., Reading, Pa.*

Catalysts—Three booklets present data on a line of catalysts for use in the polymerization of unsaturated polyesters. Information on specifications, applications, mixing procedures, and gel times is given. The three catalysts covered are as follows: Butanox (methyl ethyl ketone peroxide dissolved in dimethyl phthalate), Lucidol paste (benzoyl peroxide mixed with a plasticizer containing 50% peroxide), and Cyclonox paste (technical cyclohexanone peroxide mixed with plasticizer containing 50% peroxide). *ECI-Noury & Van der Lande N. V., Deventer, Holland.*

Wood—Revised edition of U. S. Dept. of Agriculture's Wood Handbook has been enlarged to encompass latest research findings, developments in wood-using industries, new wood products, and engineering principles. A new section on sandwich constructions includes information on the fabrication and design of sandwich panels, as well as results of research on the insulation properties, fire resistance, and durability of sandwich construction. Another new section is devoted to plywood and other cross-banded products. Sections on production of fiberboards, modified woods, and paper-base laminates are included. $2.00. *Superintendent of Documents, Gov't. Printing Office, Washington 25, D. C.*

Tooling plastics—A group of 3- by 5-in. cards, die-cut to resemble drums in which the materials are shipped, lists a line of coating, laminating, and casting resins (one resin per card) together with infor-

Get Aico's New Catalog of
STOCK PLASTIC PARTS

Over 125
KNOBS - HANDLES
•
APPLIANCE PARTS
•
ELECTRICAL FITTINGS
•
and many others to choose from

Plastic Parts from Aico's Stock Molds offer custom-styling at mass production cost. Aico's new catalog of stock plastic moldings gives full descriptions including critical dimensions of commonly used parts. If you are considering new products, plan now to use Aico Stock Plastic Parts wherever possible for positive cost reduction.

FOR YOUR FREE COPY MAIL THIS COUPON TO

AICO
finest name in molded plastics Since 1916

AMERICAN INSULATOR CORPORATION
NEW FREEDOM, PA.

Aico's Complete Plastics Molding Service includes Engineering Counsel, Mold Making, Injection, Compression, Transfer and Cold Molding plus the Molding of Fiberglas Reinforced Plastics.

Send AICO'S NEW STOCK PLASTIC PARTS CATALOG TO:

Name _____
Title _____
Company _____
Address _____
City _____ State _____
We manufacture _____

SINCE 1916 . . . MANY PRODUCTS ARE BETTER BECAUSE OF AICO MOLDED PLASTICS

mation on appropriate hardeners, mixing formulas, curing cycles, and applications. *Furane Plastics, 4516 Brazil St., Los Angeles 39, Calif.*

Cyanuric chloride—Data on properties, chemistry, and current applications of aero cyanuric chloride in such fields as plastics, resins, pharmaceuticals, explosives, dyestuffs, and others are presented in this brochure. Handling and shipping information as well as a bibliography are included. *American Cyanamid Co., Industrial Chemicals Div., 30 Rockefeller Plaza, New York 20, N. Y.*

Silicone rubber—Properties and performance of Silastic silicone rubber as affected by extreme temperatures, weathering, compression, chemicals, and dielectric service are presented in four-page brochure 9-102. Charts, graphs, and application photographs are included. *Dow Corning Corp., Midland, Mich.*

Polyurethane — Four-page bulletin contains information on Nafil resins and catalysts used in the production of polyurethane foam. Data on acoustical properties, aging properties, chemical resistance, density, fire resistance, tensile strength, thermal conductivity, and toxicity of the foam are presented. Suggested applications are covered. The materials, as supplied, consist of two liquids which, when mixed together, expand to produce the foam. *Chase Chemical Corp., 3527 Smallman St., Pittsburgh 1, Pa.*

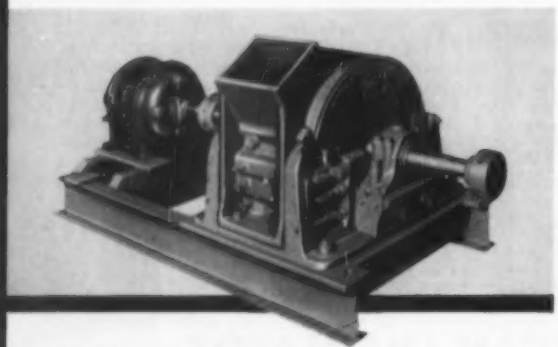
Polyethylene — Bulletin C-5-216 deals with Super Dylan polyethylene, said to have greater heat resistance, greater structural stiffness, and better appearance than the regular product. Data on physical and chemical properties as well as suggested applications are included. *Koppers Co., Inc., 1301 Koppers Building, Pittsburgh 19, Pa.*

Pipe protectors—Property data and application notes on a line of products for pipeline protection are presented in this 16-page booklet. Covered are all-weather pipe wrap tapes, pipe primer, a filament tape which is used for attaching rock shields to buried pipe, electrical insulating putty, electrical plastic tape, and electrical coating sealant for use in protection of splices in anode ground bed installations where resistance to moisture, fungus, and mechanical abrasion is required. Charts on physical and electrical insulation properties of each of the products are included. *Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.*

Pumps—Bulletin P-3 supplies data on a complete line of rotary gas ballast pumps, claimed to be the only pumps to handle water and other condensable vapors without loss of original high pumping speed. Data on designing vacuum systems are also presented. *Naresco Equipment Corp., 160 Charlemont St., Newton Highlands 61, Mass.*

Tool steel for non-metallurgists—This 44-page booklet is intended to familiarize the non-metallurgist with the six basic classifications of tool steels. Properties of the various types of tool steels are discussed and general recommendations are made as

M&M PLASTIC GRINDERS

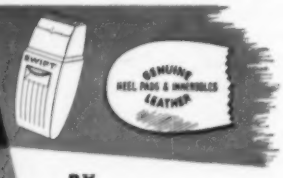


Making hard jobs easy is a regular thing for M & M Plastic Grinders. They quickly cut virgin or scrap material ranging from chunks to film into a usable product for further processing. Send us your plastic reducing problem. We also manufacture plastic pelleting machines.

MITTS & MERRILL
1016 South Water • SAGINAW, MICHIGAN

82

FOR PRODUCT IDENTIFICATION



BY HOT DIE STAMPING WITH

SWIFT ROLL LEAF

• DISTINCTIVE
• PERMANENT
• ECONOMICAL

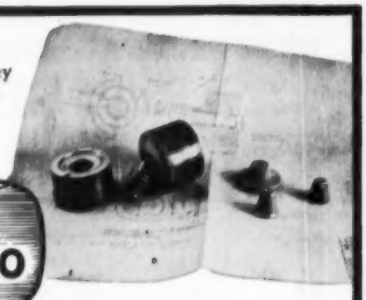
Pigment Colors, Bronze, Aluminum and Genuine Gold . . . Submit samples of your product for free testing.

Illustrated Free Booklet—"How To Brand Your Product"—mailed on request.

M. SWIFT & SONS, Inc.
10 LOVE LANE • HARTFORD • CONN.
NEW YORK • CHICAGO • ST. LOUIS • LOS ANGELES
Cable Address: SWIFTSONS

Only a COMPLETE Plant
can offer
a COMPLETE PLASTICS SERVICE
• VIRGIN INJECTION and EXTRUSION MOLDING COMPOUNDS
• CUSTOM COMPOUND YOUR MATERIALS
• COMPLETE EXTRUSION FACILITIES for FLEXIBLE and RIGID MATERIALS
• DRYCOL: Perfected coloring medium for on-the-spot in-plant dry coloring all plastics
"PIONEERS IN MODERN PLASTICS FOR OVER 30 YEARS"
GERING
Products • Inc.
KENILWORTH, N. J.

Blueprint accuracy is yours when you use 'TRU-CAST'



MANCO

BERYLLIUM COPPER MOLD COMPONENTS

- Fidelity Of Intricate Detail
- Uniform Hardness And Density
- Close Dimensional Tolerances
- Strength Plus Conductivity

YOU CAN PROFIT by knowing *all* the facts. Use your company letterhead to request a FREE copy of the 48-page, illustrated 'Tru-Cast' Handbook — the first complete and authoritative production guide to pressure-cast beryllium copper cavities and cores.

MANCO PRODUCTS, Inc.
2403 Schaefer Road, Melvindale, Mich. • Tel. Detroit: WArwick 8-7411

Here's Another Example

22 INCH "LITTLE NIPPER" RCA VICTOR'S FAMOUS TRADEMARK

WANTED CONSUMER, INDUSTRIAL, AND ADVERTISING PRODUCTS

Let us do it for you! with our

VACUUM FORMING GIANT EQUIPMENT

America's newest and largest machine for volume production. Automatic operation with dual 60 inch by 90 inch platen areas. Sheet thicknesses from 0.010 inches to 0.125 inches. Plastic sheet materials include high impact styrene, clear transparent and vacuum metallized cellulose acetate, and cellulose acetate buterate, rigid vinyl and acrylic. Up to 7 in. depth of draw.

Complete service... design, molds, production, including silk screening or printing. *Write or wire — Free estimates.*

SEE PAGES 93 TO 96
SEPT. ISSUE
MODERN PLASTICS

25 YEAR

Contract Division
W. L. STENSGAARD AND ASSOCIATES, INC.
346 NORTH JUSTINE ST., CHICAGO 7, ILLINOIS
Specialists in Merchandise Presentation • Demonstration • Displays • Exhibits

GENERAL

SCREEN PROCESS

Decorator

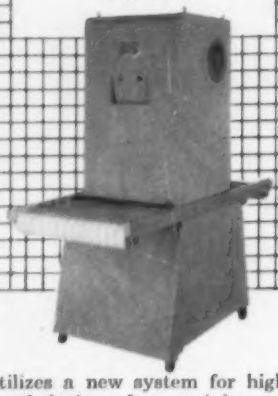
PRESSES—SERIES A

Investigate these precision built presses for high speed Screen Process printing and decorating rigid sheets. General Decorators combine Production—speed plus simplicity—Quality—controlled inking and sharp printing—and Versatility—a wide range of work on any rigid sheet material. They print on—

- Plastics
- Plywood
- Wallboard
- Metal
- Glass
- Ceramics
- Cardboard

Model No.	A1824	A1836	A2842
Sheet Size	19x25"	19x37"	28x43"
Speeds Up To	1800	1800	1500

ThermoJet DRYER



Utilizes a new system for high speed drying of many inks and coatings by greatly accelerated evaporation. Large quantities of high velocity warm air are blown through a perforated plate which directs many tiny air jets down onto the wet surface, blasting away solvent vapors.

Write for complete information

GENERAL RESEARCH & SUPPLY CO.

572 S. Division Avenue

Grand Rapids 3, Michigan

NOW! ACCURATELY MEASURE EXTRUDER MELT TEMPERATURES.

Thermo Electric "Plastic Melt" iron-constantan thermocouples can be fitted easily on an extruder head, die adapter or manifold, and inserted directly into the melt. Accurate melt temperature is maintained by using these thermocouples to set the temperature control system. They are easily removed when not in use, and can be replaced with blank bolts.

These ⅛" dia., stainless steel protected thermocouples are available in three immersion lengths: 1" (illustrated), ½", and flush. The steel bolts are ½", 20 NF, hex head. The ends are machined to seat flush inside extruder and to provide leak-proof joints.

Write for bulletin 22-200—P.

Thermo Electric Co. Inc.

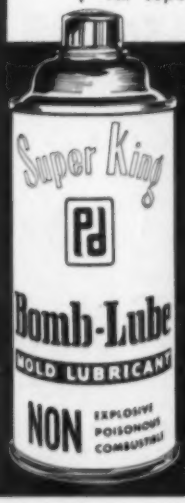
SADDLE RIVER TOWNSHIP, Rochelle Park P.O., NEW JERSEY

CANADA • THERMO ELECTRIC (Canada) Ltd., BRAMPTON, ONT.

22% PRICE REDUCTION

Bomb-Lube

- √ now in 20 oz. Super King cans
- √ 66% larger than old type cans
- √ the original patented formulation
- √ far superior to ordinary silicones



NEW LOW PRICES!

12 Super King 20 oz. containers to a case

Less than case	2.50 per can
1, 2 or 3 cases	1.90 per can
4 or more cases	1.75 per can

F.O.B. our plant, N.Y.C.

These prices reflect a 22% price reduction on Bomb-Lube . . . far below all competitive products regardless of quality.

PRICE-DRISCOLL

CORPORATION

520 Fifth Avenue

New York 36, N. Y.

to which type of application is most suitable for each classification. *Crucible Steel Co. of America, P.O.B. 88, Pittsburgh 30, Pa.*

Pumps and controls—Catalog 5001A describes a complete line of oil-hydraulic pumps, controls, and accessories for general industrial applications. *Vickers Inc., Detroit 32, Mich.*

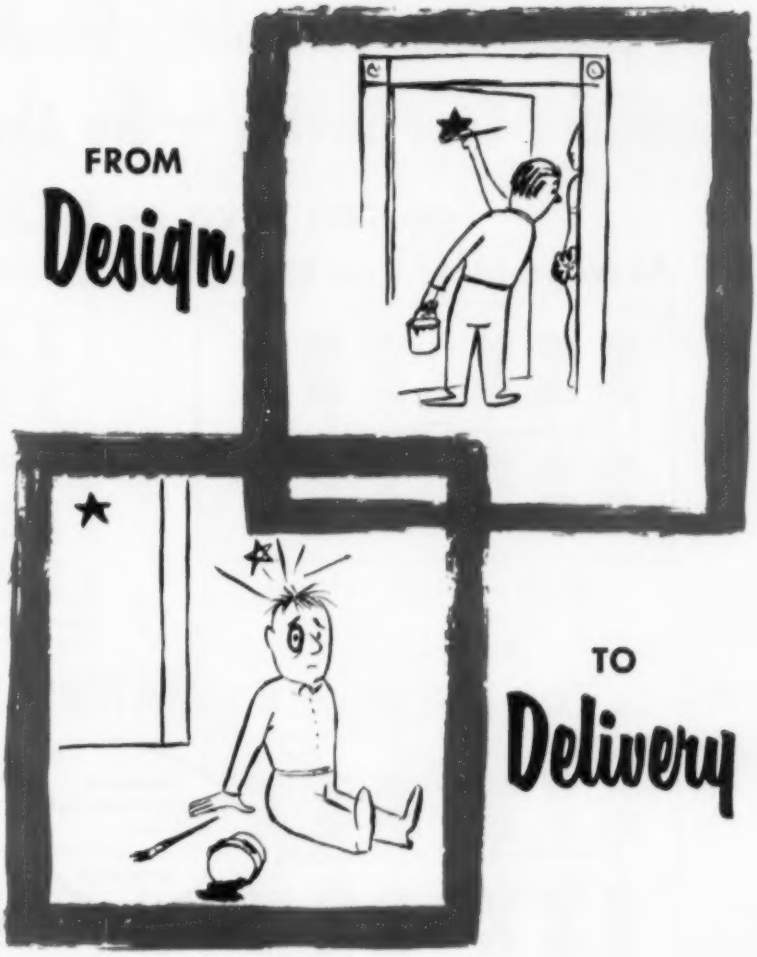
Cutters—Brochure EC-6755 describes a complete line of cutting equipment, including hand shears, bench shears, work tables, power shears, etc. An engineering service is also outlined. *Hobbs Mfg. Co., 26 Salisbury St., Worcester 5, Mass.*

Metallized Mylar—Folder A-9128 contains sample swatches of metallized, decorative surfacing materials made from Mylar polyester film, and outlines suggested applications. The swatches consist of Mylar, vacuum metallized in a range of colors, bonded to vinyls or other backings, then embossed in a variety of patterns. The folder points out that the material's unusual combination of properties offers designers and engineers a versatile tool for improving present products and developing new ones. *E. I. du Pont de Nemours & Co., Film Dept., Wilmington 98, Del.*

Vacuum forming—This well prepared booklet, entitled "Vacuum Forming Thermoplastic Sheets," provides a concise and succinct summary of the vacuum forming process and its applications. Covered are the following: the vacuum forming process, equipment, mold design and preparation, production, and decorating and postforming. A "Sketchbook of Profitable Ideas" gives drawings of numerous suggested applications. A line of plastics materials for use in vacuum forming is also described. *Monsanto Chemical Co., Plastics Div., Springfield 2, Mass.*

Surfactant—Technical Bulletin NDP 080505 describes Surfynols, non-foaming non-ionic surface active agents which structurally are ditertiary acetylenic glycols. Chemical characteristics, physical properties, applications, solubilities, and formulations are outlined. Used in combination with other surfactants, Surfynols are said to give improved wet-

(*To page* 193)



LOOK TO WATERTOWN

Here at Watertown you'll find all the facilities for seeing your plastics job through — from the idea stage right up to actual delivery of the finished product on your unloading platform. Our designers, laboratory technicians, engineers, and production experts are ready to go to work on your custom molding requirements. We work all thermoplastic and thermosetting materials . . . . by injection, compression, transfer, or vacuum forming. It will pay you to consult Watertown . . . *first.*

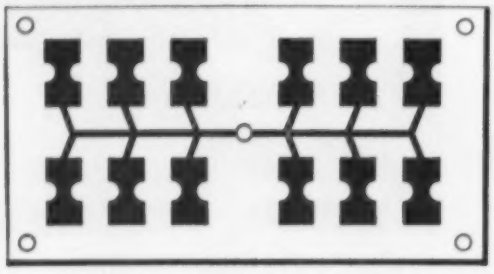
THE WATERTOWN MANUFACTURING CO.
1000 ECHO LAKE ROAD, WATERTOWN, CONNECTICUT

Hot Runner Molds - Smaller Machines

Compare Cost Saving — be Ahead of Competition

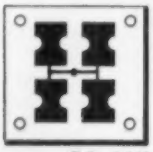
You can save on MOLD COST

Average Mold Cost $5000



Delivery time 10 to 12 weeks

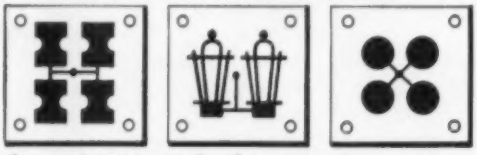
Small Mold Cost $1750



$3250 saving

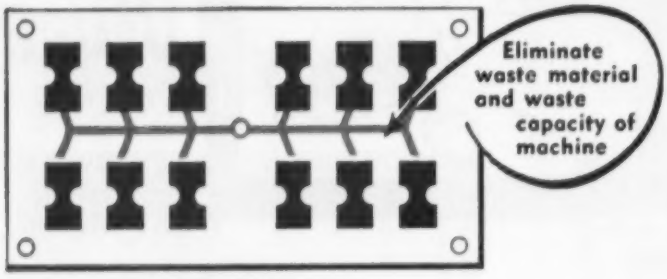
Delivery Time 4 to 6 Weeks

OR BUY 3 MOLDS - 3 ITEMS



for approximately the same investment

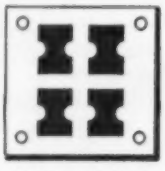
You can save on MATERIAL and LABOR



REGULAR TYPE GATING

Sprue and Runner often weigh as much or more than molded article

Hot Runner Molds—large or small



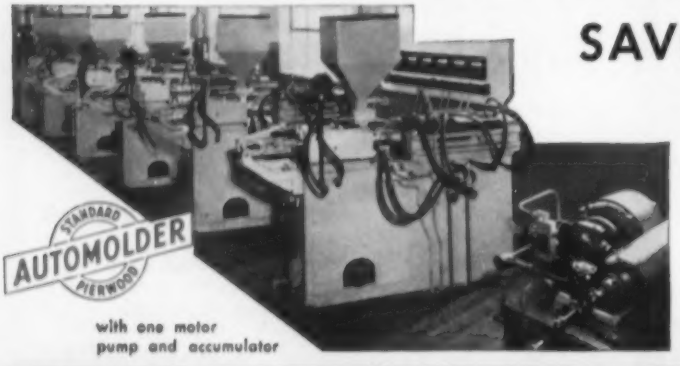
HOT RUNNER

Modern - Efficient
Economical
Material Saving
Labor Saving
Production Increase

NO SPRUE OR RUNNER

and made for ANY size machine

You can save on OPERATING COST



with one motor
pump and accumulator

SAVINGS...

LABOR	1 OPERATOR ~~6 OPERATORS~~
POWER	6 15-20 hp MOTORS ~~2 15 hp MOTORS~~
MAINTENANCE	$ ¢

Cost of operating 6 machines unbelievable figure of less than 50 cents per hour per machine

BUILT BY **STANDARD TOOL COMPANY** 213 HAMILTON ST., LEOMINSTER, MASS.

DESIGNERS AND BUILDERS OF MOLDS FOR PLASTICS FOR FORTY-FIVE YEARS

Australian Plant, Standard Tool Co. (of Australia), PTY. LTD., Sydney

Foreign Representatives, OMNI PRODUCTS CORP., 460 Fourth Avenue, New York 16, New York

for your calendar . . .

S. P. E. CONFERENCE

HOTEL STATLER • CLEVELAND, OHIO

JANUARY 18 THRU 20

REGISTRATION

STARTS TUESDAY P.M., JANUARY 17

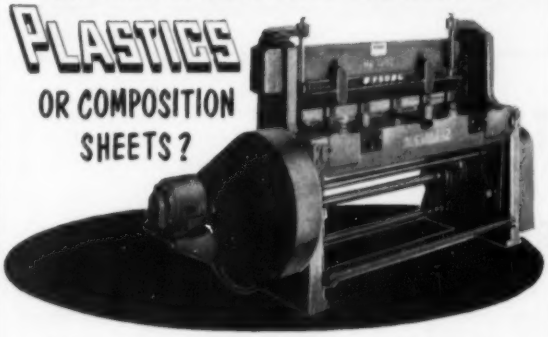
Non-members welcomed by

SOCIETY OF PLASTICS ENGINEERS

to its presentation of talks on the latest developments, activities and techniques in plastics engineering. Biggest meeting yet.

For further information contact S. A. McElroy, Hercules Powder Company, 865 Union Commerce Building, Cleveland, Ohio.

HAVE YOU INVESTIGATED SHEARING OF PLASTICS OR COMPOSITION SHEETS?



Wysong Squaring Shears . . . in power, air-power and foot-power models . . . have been successfully adapted for cutting various types of plastic and composition sheets.

Without cost or obligation, Wysong engineers will gladly test shear samples of the sheets you use and return sample cuts to you.

The use of squaring shears saves time and labor in most cases. Write for full information.

Cut Plastic Sheets With Squaring Shears

WYSONG

Wysong and Miles Company, Greensboro, N. C.

FOR FLEXIBILITY AND STRENGTH IN VINYL FLOOR TILE

CHOOSE THE RIGHT RC PLASTICIZER *TO DO THE JOB BEST!*

for specific properties in flexible floor coverings, TRY . . .

RC PLASTICIZER ODP

IF YOU WANT	
	Permanence
	Resistance to extraction
	Low cold crack
	Heat & light stability

RC PLASTICIZER B-17

IF YOU WANT	
	Low specific gravity
	Processing aid
	Economy

Write today for samples!

We'll send you a brochure on other RC products that can speed your operation, make finished products better! You can rely on Rubber Corporation's 25 years of experience.

RUBBER CORPORATION OF AMERICA
New South Road, Hicksville, N. Y.
SALES OFFICES:
New York, Akron, Chicago, Boston

PLASTIC MARKING

Stamp Names, Trademarks, etc. right in your own shop with the *Precision Built* Kingsley Machine

Simple, easy to use. No skilled operators necessary.

Write us about your marking requirements. Send a sample or dimensions of parts to be stamped. We'll reply air mail with complete details on how a Kingsley Machine can be applied to your specific problem.

UP TO 1000 STAMPINGS PER HOUR

Uniform, clean-cut impressions in gold or any color.

KINGSLEY
STAMPING MACHINE CO.
HOLLYWOOD 38, CALIFORNIA

Producing **PLASTIC PARTS** for Industry since 1876

Put Auburn's engineering "know-how" and production facilities to work producing plastic parts for your product! Backed by 78 years experience!

Our Diversified Facilities Include:

- **Compression, transfer and high-speed plunger presses up to 600 tons capacity.**
- **Extrusion machines up to 4½" screw size.**
- **Automatic rotary presses.**
- **Injection machines up to 22 oz. capacity.**
- **Vinyl dry blend compounds.**
- **Finer-textured, more uniform styrene sheets now available up to 51" wide . . . up to ¼" thick. Any color.**
- **Tool and die shop • Engineering services.**

AUBURN BUTTON WORKS, INC.
Main Office and Factories Auburn, New York

Another Reason Why . . . **DME EJECTOR PINS** *are the Finest Made*

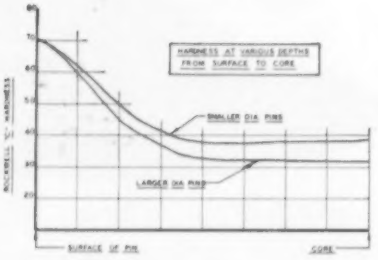
D-M-E's SPECIAL HEAT TREAT

GIVES YOU HARDNESS . . .
Where you need it most! . . . ON THE SURFACE

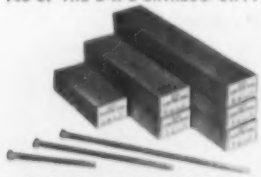
GIVES YOU TOUGHNESS . . .
Where you need it most! . . . THROUGH THE CORE

42 Standard Diameters from 1/16" to 3/4"

IMMEDIATE DELIVERY . . . 5 BRANCHES



COMPLETE DATA ON PAGE 142 AND 143 OF THE D-M-E CATALOG OR . .

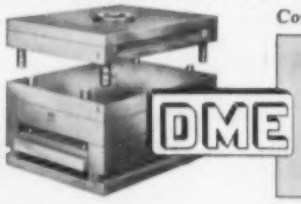


. . WRITE TODAY FOR THE 8 PAGE EJECTOR PIN DATA FILE!

DETROIT MOLD ENGINEERING CO.

6686 E. McNICHOLS ROAD — DETROIT 12, MICHIGAN — TWinbrook 1-1300

Contact Your Nearest Branch FOR FASTER DELIVERIES!



HILLSIDE, N. J. (NEAR NEWARK) 1217 CENTRAL AVE., ELIZABETH 3-5840
CHICAGO 51, ILLINOIS 5901 W. DIVISION STREET, COLUMBUS 1-7855
CLEVELAND 14, O.—D-M-E CORP. 5473 LAKE CT., ENDICOTT 1-0907
LOS ANGELES 7, CAL. 3700 SOUTH MAIN STREET, ADAMS 3-8214

3355

ting characteristics. Additional applications include pigment dispersion in emulsion paints, viscosity reduction of vinyl plastisols, and foam suppression. *Air Reduction Chemical Co., a Div. of Air Reduction Co., Inc., 60 E. 42nd St., New York 17, N. Y.*

Vinyl resins—Properties and product design potentials of a line of vinyl resins are listed on a 12- by 1½-in. strip and are revealed as the strip is slid in and out of a correspondingly sized paper envelope. The envelope has an inch and centimeter scale printed on it. *Firestone Plastics Co., Chemical Sales Div., Box 690, Pottstown, Pa.*

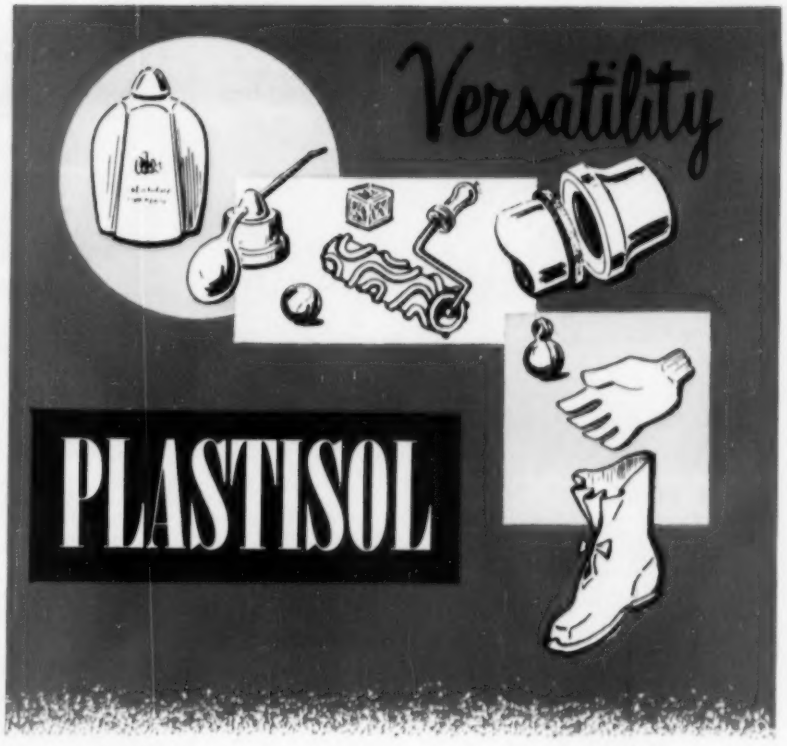
Atlanta, Ga.—"Facts and Figures about Atlanta" summarizes in concise form information on population, climate, business activity, communication facilities, utilities, and other aspects of that metropolis which will be of interest to industries contemplating relocation. Numerous graphs and statistics are included. *Atlanta Chamber of Commerce, Industrial Bureau, Atlanta, Ga.*

Suspension agent—Bulletin SD-31 gives suggested formulations and procedures for suspending pigments, abrasives, and other solids in water and oil, using Permagel, a purified, grit-free colloid. Formulations for water suspensions deal with titanium dioxide, cerium oxide, molybdenum disulfide, lime, and graphite. Oil suspension formulations are for titanium dioxide, molybdenum disulfide, and graphite. *Minerals & Chemicals Corp. of America, Metuchen, N. J.*

Lathe turning—Turning calculator aids in selection of lathe feeds and spindle speeds for fastest and most economical operation. One side of the calculator is used to determine feeds and speeds for toolroom operations, job lot turning, or initial production runs; the other side pertains to optimum conditions for continuous production operations. *Cincinnati Lathe and Tool Co., Cincinnati 9, Ohio.*

Economics of chemistry—Latest installment of five-volume "Chemical Economics Handbook" deals with the relationships between the chemical industry in the United States and other segments of the national econ-

(*To page* 197)



The versatility of vinyl plastisols lends itself to a variety of end uses. The Watson-Standard Laboratories have adapted specialized formulations for many purposes. These compounds can be applied in almost any manner to suit production facilities.

VINYL PLASTISOL MAY BE APPLIED BY:

Spraying	Knife
Cold Dipping	Roller
Hot Dipping	Trowel
Electrostatic Spraying •	Slush Molding

"Best Known Name In Plastisol"

Watson-Standard Co.

225 Galveston Ave., Pittsburgh 30, Pa.

NEW YORK OFFICE: 15 Park Row, New York 38, N. Y.
CHICAGO OFFICE: 55 E. Washington Street, Chicago 2, Ill.

PLASTICS • INDUSTRIAL FINISHES • CHEMICALS

4 POST "C" PRESS

Many Mayflower "exclusives" are built into these presses, noted for their precision and high level production. Bed plates are from 16"x24" up to 48"x96". Adaptable to a great variety of sealing operations on the lightest of plastic sheeting.

We welcome the opportunity to consult with fabricators faced with difficult sealing problems.

Mayflower ELECTRONIC DEVICES Inc.

Only Manufacturer of both Bar and Rotary Electronic Heat Sealers

UNion 3-7100

6014 Hudson Blvd. West New York, N. J.

For the BEST in **molded plastics** check with

Waterbury

...to be SURE!

Our skilled Research, Design & Engineering Division — backed by our 133 years of experience in fine tool and mold work—is famed for bettering the best that's been done before and for doing the things that have never been done!

We're at your service—anytime—to assist you in product development.

WATERBURY COMPANIES, INC.
WATERBURY, CONNECTICUT

Write for Plastics Catalog "M"

World leaders in:

COMPRESSION, TRANSFER, INJECTION, HIGH SPEED, & LOW PRESSURE MOLDING; FINISHING, ASSEMBLY

Specialists in:

AUTOMATIC INJECTION AND COMPRESSION MOLDING

MOLDING OF FIBER GLASS REINFORCED PLASTICS

SALES OFFICES

NEW YORK 16, N.Y.
CHICAGO 6, ILL.
DETROIT 7, MICH.
BOSTON 11, MASS.
CLEVELAND 13, OHIO
ROCHESTER 5, N.Y.

The Gross Profit Vs. The Net

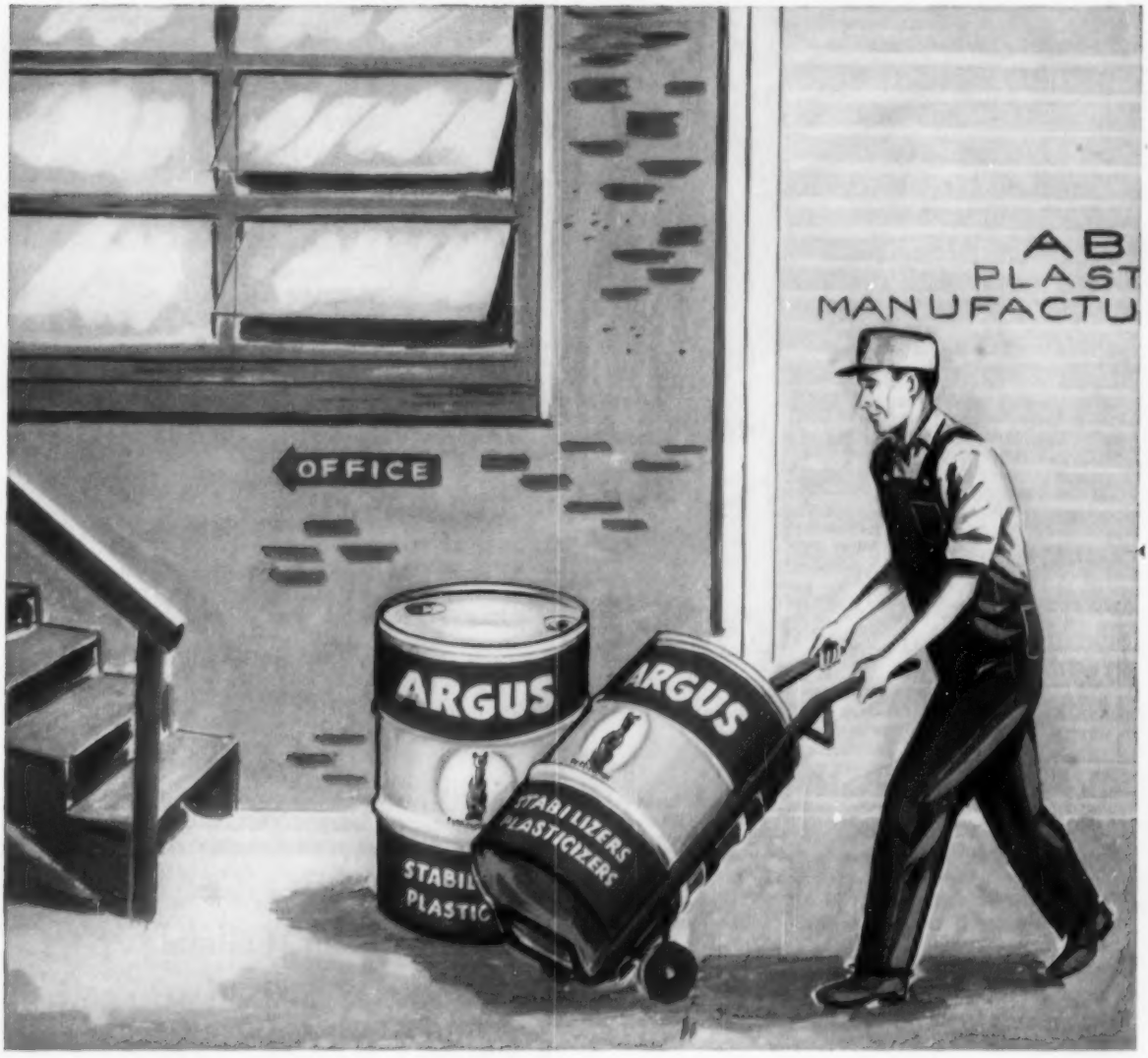
CROMPTON RICHMOND COMPANY INCORPORATED FACTORS

In these days of steadily mounting overheads, Crompton Factoring performs a very important service to its clients. It provides a continuous flow of cash for receivables so that a larger volume can be done. As your volume increases, somewhere along the line your gross profit becomes your net profit, because your overhead has been taken care of – with more to spare.

And Crompton has more to offer beyond mere factoring. It provides wise and sympathetic guidance based on more than a century of business experience . . . and it eliminates your present costs of credit extension and collection.

The Human Factor

1071 Avenue of the Americas New York 18, N. Y.



wherever Highest Quality Vinyls are made

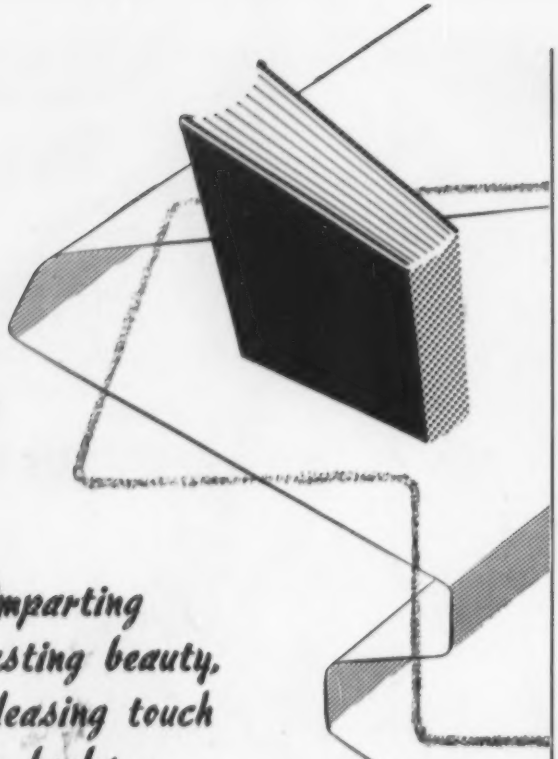
you'll find **ARGUS** *stabilizers and plasticizers*

"PURE-FECTION"

ARGUS CHEMICAL CORPORATION

633 COURT STREET BROOKLYN 31, N. Y.

REPRESENTATIVES:
H. M. Royal, Inc., 4814 Loma Vista Ave., Los Angeles
Philip Bros. Chemicals, Inc., 176 Federal St., Boston
H. L. Blachford, Ltd., 977 Aqueduct St., Montreal



Imparting lasting beauty, pleasing touch on books...

GUTTAGENA crystal-clear is unsurpassed in accentuating the eye-appeal of beautiful, stylish book covers. This highly transparent, soft plastic sheet, intensifies color effects—preserves that look of newness. The caressing touch of its glossy surface conveys a pleasant sensation to the reader. GUTTAGENA crystal-clear is available in different gauges and degrees of hardness. It can be laminated, pasted, and sealed with simple high-frequency equipment. GUTTAGENA crystal-clear is extremely tough and pliable—doesn't crack or split—withstands heavy mechanical strain and chemical reaction.

Publishers and public libraries throughout the world have taken advantage of these outstanding properties.

GUTTAGENA soft sheeting for book covers is obtainable in a full standard range of fashionable colors and grains such as Haut, Juchten, Taft, Saffian, Perlsaffian, Tetuan and Bison.

GUTTAGENA plastic cardboard is admirably suited for reinforcing book covers.

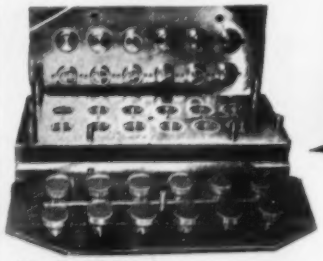
This is just one out of the many applications of GUTTAGENA which will help you increase your sales figures.

Full information of GUTTAGENA, and how and where to use it will be gladly supplied on request. ANORGANA engineers will be pleased to give you any technical advice on your plastic problems.

ANORGANA G·M·B·H · GENDORF/OBB·
GERMANY

SAVE TIME AND MONEY!
SEE YOUR PRODUCT BEFORE MAKING THE MOLD

We Create
PRE-MOLD MODELS
From Your Ideas or Designs



and Follow Through with Quality-Tested
PRODUCTION MOLDS
to the Finished Product

We Specialize in
INJECTION
COMPRESSION
& TRANSFER
MOLDS

STRICKER-BRUNHUBER CORP.
Mechanical Developers
19 WEST 24th ST. NEW YORK 10, N. Y.
WAtkins 9-0191

Complete Line of
Machinery for Celluloid and Plastics Mfrs.
JOHN J. CAVAGNARO
HARRISON ESTABLISHED 1881 Engineers and Machinists NEW JERSEY

Presses for Dehydrating, Filtering, Coking, Polishing, Stuffing, etc.

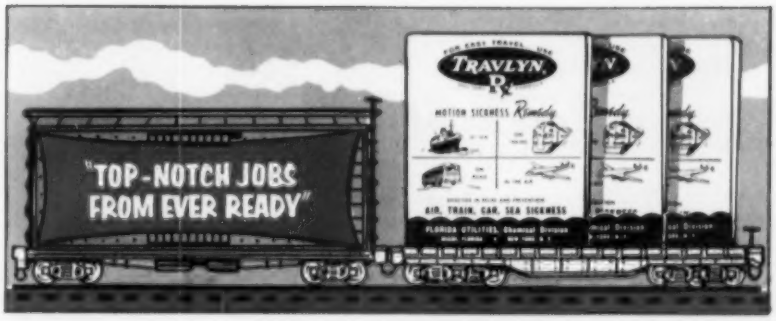
Mixers: Plain or Stainless
Preliminary or Vacuum

omy. Statistics on annual inter-industry sales and purchases are presented in concise graphs. The analysis uses government-compiled data to establish the position in the United States economy of 16 chemical and allied industries by charting their dealings with other segments of industry, business, and agriculture. The complete set of volumes that comprises the handbook covers such areas as production, sales, consumption patterns, price histories, economic correlations, financial data, and regional data. The Handbook is divided into major sections dealing with economic indicators, major industries, commodities, chemical and allied process industries, raw materials, end-chemical groups, organic chemicals, and inorganic chemicals. All information is presented on punched loose-leaf data sheets that can be changed as revisions are made. The Handbook is available on an annual subscription basis. Most data sheets are brought up-to-date at least every two years. Revised data sheets are issued approximately every three months. Supplemental data are provided whenever possible in response to requests from subscribers. Initial cost to new subscribers is $750.00 and covers the first five volumes. Renewals are $250.00 annually. A fact sheet outlining objective, scope, presentation, uses, sources, and services is available free. *Stanford Research Institute, Menlo Park, Calif.*

Vinyl colorants—Bulletin 150 describes a line of phthalocyanine blue colorants for vinyl. Formulations for Banbury compounding, plastisol compounding, and extrusion are covered. *Claremont Pigment Dispersion Corp., 110 Wallabout St., Brooklyn 11, N. Y.*

Acrylics properties—"The Dielectric Properties of Methyl Methacrylate Resins," by E. Rushton, is a study of these properties over a temperature range from −50 to 160° C. and a frequency range from 65 cycles to 24,000 megacycles. 9s.0d. (ca. $1.30). *The Electrical Research Association, Thorncroft Manor, Dorking Rd., Leatherhead, Surrey, England.*

Vacuum pumps—A complete line of high vacuum pumps is presented in 52-page catalog 425. Cutaway drawings, diagrams, graphs, performance



"We wish to express our appreciation to Ever Ready," says Mr. J. J. Eisenberg, President of Florida Utilities, "for your splendid art service in developing labels to a point where they are definitely contributing to increased sales of our products.

"The recent package design which you produced for our Travlyn motion sickness pills is the latest in a series of top-notch jobs from Ever Ready. Once again it demonstrates your unique ability to size up a customer's problem and come up with an imaginative solution."

Many of the jobs which we turn out are valuable selling aids. And these selling sparks which flow from our presses every day originate on Ever Ready drawing boards.

Ever Ready has always placed great emphasis on the conception of each label. And, to do the job, Ever Ready has a full staff of artists—layout men, designers, visual men, lettering experts—men who have had years of experience turning out labels for all kinds of products.

We invite you to take advantage of our free art service. You'll find our staff most cooperative. Why not call, write or visit Ever Ready today.

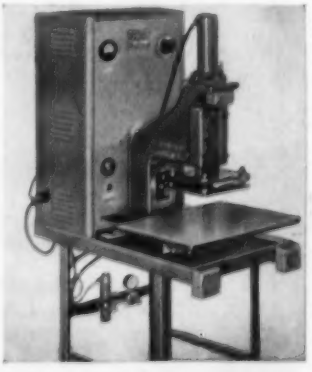
"Imagine a World Without Labels"

FREE
The Story of 8 Important Red-E-Stik Applications
Test-It-Yourself Red-E-Stik Kit

Ever Ready Label
117-20 E. 30th ST., NEW YORK 16, N. Y. PLANT: BELLEVILLE 9, N. J.

NEW! LOW-COST!
HIGH POWERED!
3 Kilowatt electronic heat sealer
by Sealomatic

Sealomatic presents a really new design in electronic heat sealers—a 3kw sealer that uses a *4kw* tube to give you plenty of reserve power. This machine has 133% power capacity! Simplified design eliminates any need for a skilled operator. And best of all, the cost is surprisingly low!



CHECK THESE SEALOMATIC 3KW ADVANTAGES:

- **No tube failure . . . plenty of reserve power (output tube *actual* rating is 4kw!)**
- **Fast, full timing control**
- **Simple, safe "one-knob" power control**
- **Dies changed in only a minute**
- **Dies protected by ARC-GUARD, Sealomatic's exclusive arc suppressor . . . automatically synchronized to sealer action *with no need for tuning!***

Write or phone for catalog and additional information about this new, low-cost sealer. Be sure to ask about our free trial offer!

SEALOMATIC ELECTRONICS CORPORATION
Dept. M, 429 Kent Avenue, Brooklyn 11, New York
EVergreen 8-9413
In Canada: Montreal Steel Rule Dies, 1362 Jean Talon E., Montreal, Quebec

curves, installation pictures, tabulations of data, conversion tables, charts, formulas, and engineering details are included. *Kinney Mfg. Div., The New York Air Brake Co., 3640 Washington St., Boston 30, Mass.*

Fiber construction—Use of stress-relaxation techniques to evaluate the physical and molecular structures of nylon, Dynel, Dacron, textile rayon, and ramie fibers by noting their behavior in distilled water, hydrochloric acid, and, in some cases, in sodium hydroxide, sodium fluoride, lithium chloride, etc., is discussed in Report PB 111655. Other methods of interpreting the stress-relaxation behavior of textile rayon are also considered. *$6.00. OTS, U. S. Department of Commerce, Washington 25, D. C.*

Acrylic esters—Ethyl acrylate, *n*-butyl acrylate, 2-ethylbutyl acrylate, and 2-ethylhexyl acrylate are described in Bulletin F-7434. Methods of polymerization and applications of polymers and copolymers are also discussed. Physical and chemical properties; uses of acrylic esters for the manufacture of adhesives, protective coatings, leather and textile finishes, etc.; and uses of acrylic esters as intermediates in the manufacture of pharmaceuticals, insecticides, etc., are also given. *Carbide and Carbon Chemicals Co., 30 E. 42nd St., New York 17, N. Y.*

Butyrate pipe—Four-page illustrated folder outlines applications and advantages of butyrate pipe. Engineering data and available sizes for a line of butyrate pipe are also presented. *Busada Mfg. Corp. 58-99 54th St., Maspeth 78, N. Y.*

Laminations—Four-page folder describes five methods of sealing plastics film and sheeting to paper—heat-sealing, dry (press) lamination, high-pressure lamination, vacuum-sealing, and wet (roller) lamination. Equipment and materials available for laminating are also covered. *Morane Plastic Co., Ltd., 21 Woodthorpe Rd., Ashford, Middlesex, England.*

Silicones—Four-page catalog describes a line of silicones, in liquid and solid forms, for use as water repellents, electrical insulation, and anti-spatter and anti-foaming agents. In addition, silicone rubber gum stock and compounds, silicone intermediates for the paint and varnish industries, silicone monomers, and silicone oils and oil emulsions are described. *Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.*

Speed controls and drives—Eight-page folder No. 188 describes motor speed controls and variable speed drives. Positive pulley designs, preset controls, and separate motor drives are also discussed. *Sterling Motors, Inc., 5401 Telegraph Rd., Los Angeles, Calif.*

Dialdehyde—Technical data bulletin presents information on properties, tentative specifications, and typical reactions of malonaldehyde tetraalkyl diacetal. The chemical can be hydrolized in the presence of aqueous solutions of mineral acid or certain inorganic salts. This behavior makes it possible to use the compound to automatically provide a continuing supply of free aldehyde for synthesis. Malonaldehyde diacetals can be used in the synthesis of

ALMAC- the greatest name for Plastics service!

...for immediate delivery of a sheet or a carload

PLEXIGLAS | ACETATE | PLEXIGLAS "R" MASKED SHEETS | NYLON RODS | POLYETHYLENE SHEETS | VINYL

Sheets, rods and tubes cut to size and pattern

ALMAC — first and fastest with the plastics you need... in any size, quantity or thickness... top service at no extra cost. A phone call, wire or letter gets immediate attention ...no requirement too large or too small, a sheet or a carload... at lowest prices.

Phone, wire, write to Dept. M for catalog & price schedule.

ONE CALL BRINGS ACTION!

PHONE REctor 2-2275

ALMAC Plastics 600 Broadway New York City 12

certain pyrimidine derivatives by reaction with urea or its derivatives. They are also active as a cross-linking and insolubilizing agent for proteins and for polyhydroxy materials. *Kay-Fries Chemicals, Inc., 180 Madison Ave., New York 16, N. Y.*

Tooling plastics—Chart lists the amount of tooling plastics needed for a given job. Laminating epoxies, die surface epoxies, metallic casting epoxies, flexible casting epoxies, casting phenolics, and foaming phenolics are the materials covered. Plasticizer and density graphs are also given. *Rezolin, Inc., 5736 W. 96th St., Los Angeles 45, Calif.*

Pyrometer maintenance—Bulletin F 7259 offers detailed suggestions for the repair and adjustment of pyrometers. Some of the troubles covered are: instrument temperature reading erratic, instrument reading too high or too low, instrument pointer sticking, etc. In all, 14 major defects are discussed. *Barber-Colman Co., Wheelco Instruments Div., Rockford, Ill.*

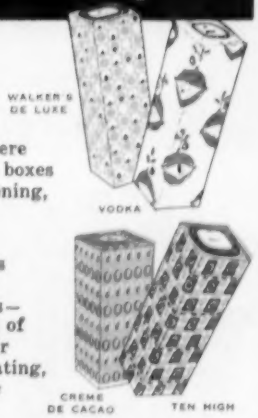
Plastics materials—Ten-page plastics fact file lists a line of plastics materials, intermediates, adhesives, finishes, etc., together with end-use applications. Discussed are: styrene, polyethylene, vinyl chloride, resorcinol, melamine, phenolic, etc. Uses of various resins for bonding, laminating, surface-coating, etc., are also given, along with discussions of materials used in extruding, calendering, and coating. In addition, a four-page chart presents details of fabricating methods, typical uses, general properties, and characteristics. *Monsanto Chemical Co., Plastics Div., Springfield 2, Mass.*

Pumps—Bulletin 52B6105C describes two-stage boiler pumps for boiler feed and other high-pressure applications. Two types of pumps are discussed—close-coupled and frame. The frame-type is designed for use with any kind of prime mover and for any type of drive with flexible, rigid, or hydraulic coupling. In the close-coupled pumps, motor and pump are mounted on a common shaft. Dimension tables for both types of pumps and performance charts are included. *Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis.*

Hiram Walker's new personalized Holiday gift packages presented a tough labeling problem. Their packaging would work as planned only if the labels could be removed and resealed.

Avery's Kum-Kleen Pressure-Sensitive Labels were selected for all nine of their unique gift wrapped boxes because they are self-adhesive, require no moistening, are easily removed...yet can be used for instant re-sealing simply by pressing them on again.

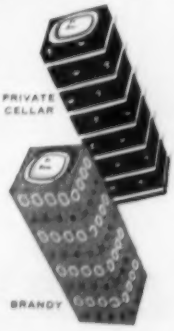
Although Avery's ability to meet Hiram Walker's production and delivery needs was an important consideration in their choice of Kum-Kleen labels—the deciding factor was Avery's complete control of production from start to finish. Avery makes their own adhesives and do their own designing, laminating, die-cutting, printing and embossing. *Avery is the only manufacturer of pressure-sensitive labels with all of these facilities.*



What a difference AVERY Kum-Kleen LABELS make!

AVERY PRESSURE-SENSITIVE LABELS

Write today for full details on Hiram Walker's special labeling problem and other case histories that show why Avery Pressure-Sensitive Labels were the best answer. Perhaps you also can use Avery Labels profitably on your products or packages.



AVERY ADHESIVE LABEL CORP., Custom Div. 127
117 Liberty St., N.Y. 6 • 1616 S. California Ave., Monrovia, Calif.
608 S. Dearborn St., Chicago 5 • Offices in Other Principal Cities

SERVICE YOU CAN TRUST!

PLANDEX Reclaiming Makes Your Plastics Scrap More Valuable!

√ Precision processing and laboratory control guard both QUANTITY and QUALITY

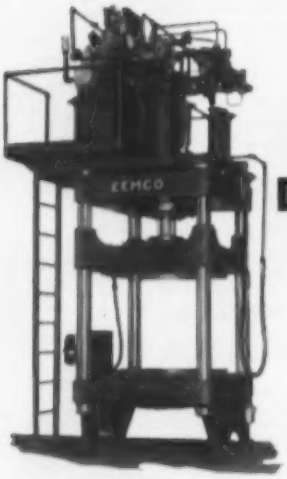
- SORTING, GRINDING
- COMPOUNDING
- BLENDING, COLORING
- STRAINING
- PELLETIZING
- MASTER BATCHING

The Plandex plant is custom-designed for the ultimate in production efficiency and economy. Fast, accurate, dependable service is our only product. Customers throughout U.S.A. and Canada.

It's our job to help you solve your plastics scrap problems. Write for catalog No. 155 today:

PLANDEX CORPORATION
Chestnut Street
DOWNINGTOWN, PA.

ERIE ENGINE & MFG. CO.
complete installations for
REINFORCED PLASTICS MOLDING



Downward acting Reinforced Plastics Molding Press, specially designed and built to suit a specific need.

including
PRESSES
HYDRAULIC UNITS
PREFORM MACHINES
ROVING CUTTERS
OVENS

Consult us for specifications and quotation for any complete or partial Fiberglass Molding installations.

CALL OR WRITE
FOR COMPLETE DETAILS

EEMCO ERIE ENGINE & MFG. CO.
12th ST. & East Ave., ERIE, PA.

PLASTICS AND SYNTHETIC RESIN PRODUCTION
From Statistics Compiled

Materials	*Total p'd'n first 7 mos. 1955*	*Total sales first 7 mos. 1955*
CELLULOSE PLASTICS:*		
Cellulose acetate and mixed ester		
Sheet, under 0.003 gage	10,612,164	10,763,272
Sheets, 0.003 gage and over	8,488,092	8,213,255
All other sheets, rods, tubes	4,383,840	3,991,903
Molding, extrusion materials	50,834,725	49,473,997
Nitrocellulose sheets, rods, tubes	2,766,111	2,877,887
Other cellulose plastics	3,646,737	3,327,290
PHENOLIC AND OTHER TAR-ACID RESINS:		
Molding materials[a]	118,226,250	110,778,941
Bonding and adhesive resins for:		
Laminating (except plywood)	38,567,509	28,211,028
Coated and bonded abrasives	35,067,343	25,726,262
Friction materials (brake linings, clutch facings, etc.)	14,734,721	13,449,990
Thermal insulation (fiber glass, rock wool)	26,615,445	26,713,639
Plywood	25,445,639	20,458,656
All other bond and adhesive uses	11,299,140	11,295,136
Protective-coating resins	14,904,591	14,591,744
Resins for all other uses	21,351,735	19,751,604
UREA AND MELAMINE RESINS:		
Textile-treating and textile-coating resins	23,691,831	22,674,760
Paper-treating and paper-coating resins	12,362,121	11,678,914
Bonding and adhesive resins for:		
Plywood	54,205,690	51,586,826
All other bonding and adhesive uses, including laminating	15,463,935	15,730,962
Protective-coating resins	21,907,099	16,274,259
Resins for all other uses, including molding	45,169,280	44,412,912
STYRENE RESINS:		
Molding materials[a]	232,259,529	213,233,964
Protective-coating resins	57,595,139	53,796,368
Resins for all other uses	47,555,678	45,796,760
VINYL RESINS, total[b]	394,639,292	371,072,844
Polyvinyl chloride and copolymer resins (50 percent or more polyvinyl chloride) for:		
Film (resin content)		49,190,317
Sheeting (resin content)		29,961,474
Molding and extrusion (resin content)		104,086,566
Textile and paper treating and coating (resin content)[c]		35,102,362
Flooring (resin content)		32,522,313
Protective coatings (resin content)		16,604,349
All other uses (resin content)		27,535,360
All other vinyl resins for:		
Adhesives (resin content)		18,109,172
All other uses (resin content)		60,960,930
COUMARONE-INDENE AND PETROLEUM POLYMER RESINS	146,844,608	146,092,346
POLYESTER RESINS:		
For reinforced plastics	30,183,686	24,664,818
For all other uses	1,958,444	2,147,120
POLYETHYLENE RESINS:		
MISCELLANEOUS:		
Molding materials[a,d]	113,107,095	85,641,574
Protective-coating resins[e]	2,679,664	1,576,869
Resins for all other uses[f]	61,167,801	79,859,100

* Dry basis designated unless otherwise specified.
** Partially estimated. † Revised.
[a] Includes fillers, plasticizers, and extenders. [b] Production statistics by uses are not representative, as end use may not be known at the time of manufacture. Therefore, only statistics on total production are given. [c] Includes

IN POUNDS* FOR JUNE AND JULY 1955
by U.S. Tariff Commission

*June***		*July***	
Production	*Sales*	*Production*	*Sales*
1,707,652	1,767,138	1,077,597	1,315,909
1,434,461	1,365,705	753,608	978,225
760,460	718,989	451,996	437,319
7,723,252	7,458,227	6,271,432	6,280,493
415,174	378,722	259,574	260,022
333,259	278,710	313,320	282,501
†17,576,673	†17,775,033	12,226,917	11,680,991
5,770,941	4,551,788	4,550,887	3,338,788
†1,757,743	†1,821,617	941,743	781,345
†2,789,829	†2,506,389	1,584,908	1,440,693
†5,207,733	†5,060,408	4,267,739	4,152,783
3,966,008	3,311,631	2,820,506	1,654,135
†2,264,209	†2,142,614	2,052,582	2,056,017
†2,469,273	†2,409,031	1,921,583	1,772,893
2,660,619	2,495,115	2,036,713	1,878,748
3,049,339	2,918,617	2,491,123	2,328,054
1,636,475	1,280,207	1,627,460	1,427,924
8,209,169	7,673,732	6,402,438	7,209,323
2,407,088	2,441,859	1,209,136	1,509,077
3,522,095	2,479,299	2,853,360	1,950,403
5,929,419	5,330,487	5,250,837	6,327,575
34,604,231	28,944,532	30,015,128	25,016,828
8,820,871	7,924,761	6,947,811	5,585,023
7,668,970	6,437,161	5,748,965	5,522,396
56,117,522	52,630,165	54,818,128	44,631,191
	7,103,601		5,925,370
	3,969,696		3,764,786
	14,832,342		11,943,012
	5,035,689		4,304,475
	4,317,783		3,601,146
	2,138,727		2,027,715
	4,402,650		3,540,106
	2,322,066		2,605,634
	8,507,611		6,918,947
20,993,056	21,357,009	20,558,348	20,001,474
5,562,760	4,292,873	3,300,529	2,874,462
249,040	205,024	126,388	69,221
30,390,036	27,930,266	32,022,375	25,825,284
4,294,959	3,867,585	2,840,500	3,189,059
395,940	246,274	384,123	207,085
6,646,002	6,143,772	6,125,445	6,045,679

data for spreader and calendering-type resins. [d] Includes data for acrylic, polyethylene, nylon, and other molding materials. [e] Includes data for epichlorohydrin, acrylic, polyester, silicone, and other protective-coating resins. [f] Includes data for acrylic rosin modifications, nylon, silicone, polyethylene, and other plastics and resins for miscellaneous uses.

COTTON FABRICS

FOR COATING AND LAMINATING

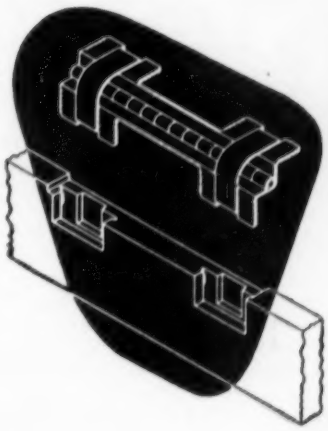
★

J.H. LANE & CO., Inc.

250 W. 57th St. • New York, N. Y.

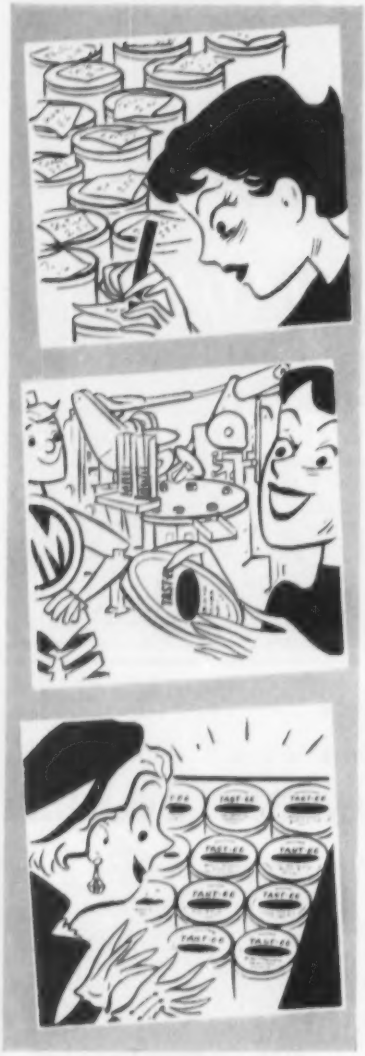
HINGES . . .
for PLASTIC BOXES

press-fit assembly
(Holds like
a drive-screw)
with
or without
double action
"C" Springs



GEISSEL Mfg. Co., Inc.
109 LONG AVENUE
HILLSIDE, N. J., U. S. A.

making a
MARKED IMPROVEMENT
in 2-COLOR
PLASTIC LID MARKING



Popular new plastic container lids present unusual marking problems. Markem—source of better marking methods for 44 years—solves them. A new Markem machine prints complete label detail and decorative or trademark designs—in two colors—on polyethylene, styrene and paperboard lids, at production rates. Automatic feed and ejection equipment is available. If your problem is marking container lids—or some other part, product or package—let Markem help you. Write Markem Machine Company, Keene 20, New Hampshire.

Markem

All-weather radar shelter, consisting of reinforced plastics panels bolted over an aluminum framework, can be assembled, complete with radar, in less than three hours

Reinforced Plastic Shelter Quickly Erected

TAKING advantage of the physical properties of reinforced plastics materials, especially their strength, light weight, and resistance to outdoor exposure, a new radar shelter that can be transported by air or by truck and set up in less than 3 hr. has been developed for the U. S. Air Force.

Made of rugged polyester-fibrous glass laminate panels assembled over an aluminum framework, the all-weather radar station was designed to step up the speed and mobility of aircraft spotting teams. The system was developed to permit radar teams to set up an emergency warning system in a few hours, to dismantle and move on quickly, and to allow the radar teams to keep up with the advancing forces when necessary. Once erected, however, the shelter is durable enough to withstand winds up to 90 miles an hour.

The shelter consists of two arch-shaped structures, each identical in structural design and made up of interchangeable sections. The larger of the two, to house the radar operating equipment and personnel, is 32 ft. long, 24 ft. wide, and 12 ft. high at the center. The second structure is the same width and height, but measures only 18 ft. in length and is used for radar maintenance work.

Framework for the shelters consists of formed aluminum arches spaced about 4 ft. apart. The molded reinforced plastics panels, each about 7 ft. long and 3½ ft. wide, are bolted to the arches during erection. The floors, made of aluminum-faced honeycomb sandwich panels, are laid on a series of beams which, in turn, rest on jacks. Thus, the entire structure can be leveled, where necessary.

A fully-equipped radar operations shelter, together with the smaller auxiliary maintenance shelter can be transported by three trucks. A 14-man crew, equipped with only ladders and wrenches will be able to remove the fabricated sections from the truck, assemble the shelter, install the radar equipment, and connect the shelter with outside antenna and power-generating units within the 3-hr. period. Stressing simplicity and rapid erection time, all arches, roof, and floor panels are completely interchangeable, eliminating the necessity for sorting materials or hunting out special pieces.

CREDITS: Manufactured by Luria-Cournand, Inc., Havre de Grace, Md.; Laminac polyester resin, specially modified by the molder to obtain extra strength and adhesiveness, supplied by American Cyanamid Co.

Floor of shelter is made of aluminum-faced honeycomb sandwich panels

From colorful and durable panels for delivery trucks to handsome television cabinets...

Pittsburgh *Selectron* POLYESTER RESINS

Now Ready For A Thousand New Uses!

Just a few products in which Pittsburgh SELECTRON Resins are now used—

Aircraft structural parts
Radomes for electronic equipment
Life floats
Ballistic panels
Helmets
Boat hulls
Machinery housing and guards
Trays
Tote boxes
Food lockers
Garbage pails
Baskets for automatic dishwashers
Baskets for automatic washers
Wash tubs
Tool chests
Shipping containers
Instrument cases
Laundry hampers
Kitchen containers
Fishing rods
Sinks
Street signs
Traffic signs
Fluorescent light fixtures
Television cabinets
Loudspeaker housings
Gas meter housings
Structural panels for offices and homes
Door and transom lights
Awnings and canopies
Greenhouse panels
Skylighting
Molded chairs
Prefabricated houses and garages
Truck bodies

COUNTLESS products benefit from the combination of beauty and durability Pittsburgh SELECTRON Polyester Resins can give—and usually at reduced manufacturing costs.

SELECTRON Resins are used in products ranging from truck panels that withstand extreme hot and cold, rain, snow, and sleet to television cabinets that serve as focal points of beauty in homes everywhere.

SELECTRON Resins are thermo-setting polyesters which are available in consistency from a thin syrup to extremely high viscosity. They polymerize to form solids, with or without heat and with or without pressure.

When combined with such fillers as fiber glass, cotton, rayon, nylon, felt, sisal, paper, etc., SELECTRON Resins provide a new kind of material that is lighter than aluminum, yet—weight for weight—is stronger than steel. This material has great impact resistance and withstands the deteriorating influence of weather, sunlight, heat, abrasion and many chemicals. It can be molded in durable colors.

Parts in which SELECTRON Resins are used can be molded either by hand lay-up, direct molding, continuous lamination or pre-forming. These resins can also be used without fillers for casting, potting and impregnating.

Investigate the advantages of SELECTRON Resins that may make your products better looking, stronger and more durable. We'll be glad to have one of our engineers discuss your problems with you without cost or obligation. Such a visit may point the way to important production economies and added sales appeal.

SEND FOR FREE BOOKLET

● Write, wire or phone today for our new booklet containing description of SELECTRON Polyester Resins and explaining many of the ways in which they can be used. Pittsburgh Plate Glass Company, SELECTRON Products Division, Gateway Center, Pittsburgh, Pa.

PITTSBURGH *Selectron* PG

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

MOLD TEMPERATURE CONTROL AT ITS BEST!

THERMOLATOR

REG. U.S. PAT. OFF.

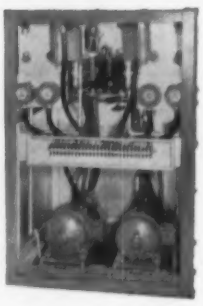
New . . . Entirely Automatic Model "H"

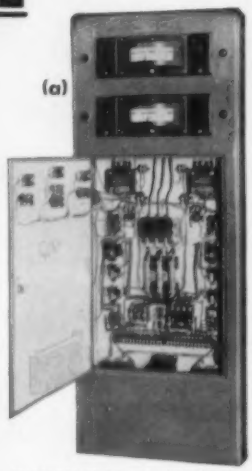
Manufactured under U.S. Pat. #2,632,088, and built to conform to JIC standards.

- **At-A-Glance Supervision with Remote Control Feature**
  Eases the load of supervision. Large distant-view millivoltmeter Pyrometer Scales and Pilot Lights permit instant check on mold operating conditions. Cabinet (a) designed for location with other panel mounted Press Controls.
- **Push Button Start —Completely Automatic Operation**
  One push button starts operation. After fast heat-up, large Wattage Auxiliary Heaters cut out for close control. Automatically adds or drains heat to maintain mold temperatures within $\frac{1}{20}$° F. in range to 250° F.
- **Unequalled Mold Temperature Control Performance**
  Assured by High Velocity-High Capacity circulation, with exclusive patented control features.

(a)

(b)





THERMOLATOR Model H includes Control Cabinet (a); and Operating Unit (b) for permanent installation.

FOR INFORMATION WRITE TO . . .

Industrial MFG. CORP.

Specialists in Industrial Heat Transfer by Liquids

31 E. GEORGIA ST. · INDIANAPOLIS 4, IND.

REPRESENTATIVES

F. W. Jennison, 54 Merrick Ave., Merrick, N. Y. IN CANADA: Richardson Agencies, Ltd., 454 King St., West, Toronto 1, Ontario. FOR EUROPE: Merac, 50 Church St., New York 7, N. Y.

The only molder in this area offering all

5

major molding methods

1. COMPRESSION
2. TRANSFER
3. PLUNGER
4. INJECTION
5. COLD MOLD

That means molding assignments are handled in terms of what is best . . . what is most economical . . . not what equipment is available. Perhaps you're considering the manufacture of a plastics product. Before you invest anything, spend a little time discussing your plans with the Plastic Molding Corp. Because we are prepared to offer you a choice of molding methods, we are prepared to offer what's best for you. Call or write today for complete details.

Molders of plastics for over a quarter century

Plastic Molding Corporation

Sandy Hook, Connecticut

CUT FIBER GLASS

MATS, WADDING, STRIPS, ETC.

FASTER! MORE EASILY!

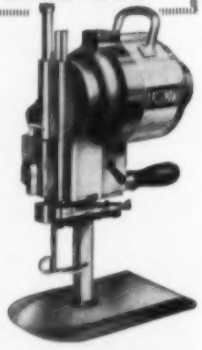
FLAT abrasive belt sharpening puts a strong V-shaped cutting edge on the

EASTMAN

Automatic Belt Sharpened

BLUE STREAK

Knives cut easier . . . cut more with each sharpening . . . last longer.



EASTMAN BLUE STREAK
shown above, cuts multiple layers into intricate shapes.

ASK FOR A DEMONSTRATION

See your phone book for nearest agent or write us direct.

EASTMAN ROUND KNIFE
shown to the left, for straight line cutting or fixed production line work.

EASTMAN MACHINE CO., 779 WASHINGTON STREET, BUFFALO 3, N.Y.

Styrene Foam Float

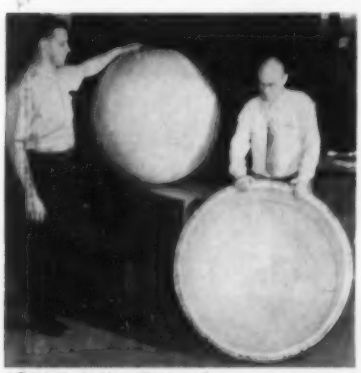
DEVELOPMENT by the U. S. Navy of a 42-lb. molded styrene foam float that can support 20 times its own weight has given impetus to scientific experiments with sonar for the underwater detection of submarines.

Primary purpose of the development was to find a means of supporting the heavy and complex sonar equipment from a tough, lightweight float that could be dropped from aircraft into the water and then recovered after the instruments had served their purpose. Following the decision to use styrene foam to manufacture the float, Navy scientists designed and built a mold, developed a manufacturing technique, and produced six floats for use in their submarine detection experiments. The entire job was completed within six weeks.

The virtually unsinkable float was molded in the form of a sphere 36 in. in diameter and is capable of supporting 800 lb. of instruments afloat. It is also tough enough to withstand the impact of being dropped with these instruments from a dirigible or other low flying aircraft into the water.

In use, the sphere floats on top of the water with the sensitive measuring and detection instruments suspended underwater beneath it. Because the sphere is colored a bright yellow, it can easily be spotted from the air and picked up, along with the instruments, when the mission has been accomplished.

CREDITS: Dylite expandable styrene supplied by Koppers Co., Inc., Pittsburgh, Pa.



Official U. S. Navy Photograph

Mold (right) is used in manufacture of spherical styrene foam float (left)

THE BOX
SETS THE STAGE . . .

. . . when you raise the curtain on a new product. A modern container dramatizes the features of your product. Yet, the cost of a fresh design for your box is just a small fraction of what you spend on product development.

Strikingly handsome printed effects are now made possible by Gaylord's newly-developed "Oyster White" boxboard. For samples and complete information, call your nearby Gaylord office.

Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES
KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

SALES OFFICES FROM COAST TO COAST ★ CONSULT YOUR LOCAL PHONE BOOK

what is the LIFE EXPECTANCY of your plastic products?

Get the longest life possible at no increased cost with Di-iso Decyl Phthalate Plasticizer.

Di-iso Decyl Phthalate is the most permanent phthalate plasticizer commercially available.

This recently developed phthalate plasticizer makes it possible for you to substantially increase the life of your vinyl products . . . at a volume cost less than that of Dioctyl Phthalate. In severe aging tests (120 hours @ 121°C. and 96 hours @ 136°C.) the results for Di-iso Decyl Phthalate indicated only about one-half the loss of flexibility of plastics containing Dioctyl Phthalate.

Di-iso Decyl Phthalate is a primary plasticizer for most resins. It is recommended for any composition where it is desired to have the all-around good properties of Dioctyl Phthalate with longer lasting flexibility.

fmc

Technical literature and samples will be sent immediately upon request without obligation.

OHIO APEX fmc

OHIO-APEX DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
NITRO, WEST VIRGINIA
DEPT. 48

☐ Send me technical literature. ☐ Send me sample of Di-iso Decyl Phthalate Plasticizer.

NAME .....
COMPANY .....
ADDRESS .....
CITY ..... STATE .....

WHEN IN NEED OF MATERIALS, PARTS OR EQUIPMENT . . . MAKE USE OF THE

42,293 ADVERTISEMENTS
PLACED BY
11,322 ADVERTISERS IN

THOMAS REGISTER

Your Where-to-Buy Encyclopedia

Thomas Publishing Company
461 Eighth Avenue, New York 1

NEW! KABAR
ELECTRONIC HEAT SEALERS

Seal Vinyls and Acetates
- Easier
- Faster
- Cheaper

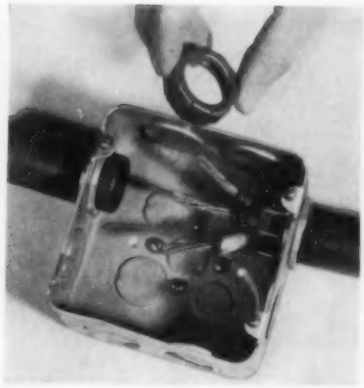
. . . By Actual Comparison with Machines in their Power Class

DO YOU KNOW
The Newest Heat-Sealing Techniques?

Kabar has the know-how . . . gained in helping produce tens of thousands of items for thousands of manufacturers.

CALL FOR A KABAR MAN!

Kabar MANUFACTURING CORPORATION
1907 WHITE PLAINS RD., N. Y. 62, TA 3-5104
THE BETTER YOU SEAL THE EASIER YOU SELL



Tough molded acetate bushings are screwed onto conduit ends

Acetate Bushings

RUGGED insulating bushings molded of a specially formulated tough acetate can be easily screwed onto conduit ends and are successfully replacing metal bushings.

The injection molded acetate chip-proof fittings have full 95° free-starting threads and molded-in indented ribs that permit tightening or loosening with only a screwdriver. After the wiring is pulled through and properly cut and trimmed, two locknuts are used—one on either side of the connecting box—before screwing the insulating bushing into place. When it is tight, a screwdriver is placed in a groove between the ribs and pressure is applied with the other hand. This effectively locks it on. To remove the bushing, pressure simply is applied in the opposite direction.

Since conduit ends receive rough handling, the toughness of cellulose acetate was a major factor in its selection. These extremely durable acetate bushings are resistant to harsh treatment and stand up under abuse. The manufacturer claims that they won't shatter or break even when hit repeatedly with a hammer. In addition, the acetate fittings have high dielectric strength (325 v./mil), will not support combustion, and will not distort at temperatures up to 158° F.

The acetate fittings are available in 12 different sizes, ranging from ½ to 6 in. in diameter.

CREDITS: Efcor insulating bushings are distributed by Electrical Fittings Corp., Woodside 77, N.Y.; Tenite acetate is supplied by Eastman Chemical Products, Inc.

buy the
•EXTRA
•VALUE
in

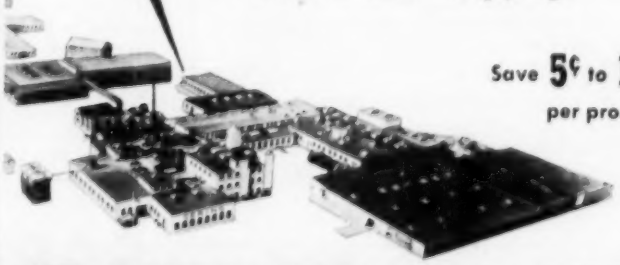
MILES AHEAD • BEST BY TEST

SHER-E-T-C-H

POLYETHYLENE
COLOR
CONCENTRATE

The easy, inexpensive-to-use colorant. Gives complete color-dispersion in most critical color applications.

- Made by intensive compounding of time-tested quality pigments in non-toxic virgin polyethylene
- No dust or risk of color contamination
- Safe — Easy — Clean — Dependable
- Bright toy and housewares colors, brown for TV lead-in wire; black for polyethylene pipe
- Furnished in dust-free, uniform-size pellets
- Packed in 50-lb. multi-ply bags



Save 5¢ to 15¢
per product pound

SERVICE
QUALITY
DEPENDABILITY

GERING PRODUCTS INC.
KENILWORTH, N. J.

BRANCH Offices: Chicago, Ill., Mansfield, Ohio, Cleveland, Ohio, Detroit, Mich.

chem·o·sol®

solves another problem by WEATHER-PROOFING AUTOMOTIVE LIGHT SOCKETS

An automobile's light sockets are in a particularly vulnerable spot and for safety's sake must function reliably. Above all, dust and moisture must be kept out.

The answer was found in the use of **chem-o-sol**, a 100% solids liquid vinyl dipping and molding compound which was formulated to be applied economically on a continuous line production basis. This **chem-o-sol** is not only tough and flexible but has completely sealed the socket from moisture, dirt and chemicals.

Here is another example from our files showing how a product was improved through using **chem-o-sol**.

Chem-o-sols are available for many application methods. New products are constantly being developed and established products improved by spraying, molding, die-wiping and knife- or roller-coating this versatile basic material.

Our completely equipped laboratory and trained chemists stand ready to assist you in formulating the *exact* **chem-o-sol** to improve your product.

Dipped sockets are a product of Watts Electric and Manufacturing Company, Birmingham, Mich.

Write for Bulletin 141

Chemical Products CORPORATION

KING PHILIP ROAD • EAST PROVIDENCE R. I.

SPRAY PAINTING MASKS
A competent engineering staff will counsel with you on the most efficient technique for handling your particular requirements.

CLAMPS AND FIXTURES
Positive pressure and exact registration of the part in the mask. Reduce rejects. Free both hands for productive movements.

PRODUCT DEVELOPMENTS BY C·M CONFORMING MATRIX

CUT FINISHING COSTS THROUGH INCREASED PRODUCTION

Send for Free Literature Now!

AUTOMATIC MACHINES
Increase production hundreds to one over hand methods. Reduce labor costs. Eliminate need of experienced workmen.

MASK WASHING MACHINES
50% faster than any other make. Cut solvent consumption. Avert production delays due to damaging of masks by hand scrubbing.

CONFORMING MATRIX CORPORATION

364 Toledo Factories Building — Toledo 2, Ohio

Before you buy...

compare all Temperature Control Units for molds, rolls, cylinders, drums

The new SARCOTROL heating and cooling unit is fully automatic as shown in the accompanying list of features. It maintains even face temperatures by recirculating temperature-controlled water at high velocity through molds or roll jackets.

- Independent circulating systems
- No need for special heat transfer liquids for temperatures to 300° F
- Automatic heater protection
- Automatic heating rate selection
- Saves electricity and water
- One knob changes temperature control setting
- Many other features

SARCO

Improves product quality and output

2085F

Please advise if you are interested in temperature control for molds or for rolls. Bulletin and case histories will be mailed to you by Sarco Company, Inc., Empire State Building, New York 1, N. Y.

for the greatest power in the smallest space ...

STEWART BOLLING Spiral-Flow INTENSIVE MIXERS Super Power Models

Bolling No. 10 Mixer, 450 h. p. with compound drive.

among STEWART BOLLING features are:

Spiral-Flow sides to give exceptional temperature control.

Split end frames for unrivalled accessibility.

Anti-friction bearings needing less power—and others.

Inquire about them

Your production program demands that you look into the advantages of Bolling Spiral-Flow Intensive Mixers. They are powered with Bolling's sensational compound drives which transmit power directly to both rotors. All external gearing is eliminated. Applications which call for double the usual power output are readily solved. Higher rotor speeds and chamber pressures improve dispersion and cut mixing time. You get maximum power in much less space.

Designed for tomorrow's speeds and pressures, Stewart Bolling mixer drives are ready to go to work for you today. We offer four production sizes and a practical laboratory size.

STEWART BOLLING & COMPANY, INC.
3196 EAST 65TH STREET • CLEVELAND 27, OHIO

• INTENSIVE MIXERS AND MILLS • CALENDERS • REFINERS • CRACKERS HYDRAULIC PRESSES • PUMP UNITS BALE SLITTERS • SPEED REDUCERS

After the preform has been placed on the mold, the polyester resin is added and the final cure produces this long-lasting Toteline container.

"Garan Roving makes Toteline boxes chemically resistant, stronger, longer lasting"

—A. W. Levenhagen, president, Molded Fiberglass Tray Co.

"Toteline trays and boxes must withstand rugged treatment. That's why we use L·O·F Glass Fibers' Garan Roving. It has superior wetting-out characteristics, which give the boxes greater strength, and resistance to moisture and chemical agents. Garan Roving helps Toteline boxes last longer."

L·O·F Glass Fibers' exclusive Garanized® roving imparts great flexural and tensile strength to reinforced plastics. It bonds strongly and uniformly to polyester molding resin, both chemically and mechanically. Such plastics, reinforced with Garan roving, are stronger and have higher wet-strength retention. For numerous applications with epoxy, silicone, polyester resins, Vitron® VR-12 Roving is finding wide use among molders.

For technical counsel on how Garan Roving can improve your product, contact our nearest sales office, or write: L·O·F Glass Fibers Company, Dept. 15-115, 1810 Madison Ave., Toledo 1, Ohio.

LOF GLASS FIBERS Garan ROVING

L·O·F GLASS FIBERS COMPANY
TOLEDO 1, OHIO

Shower Enclosure

SLIDING door panels for a new type of bathroom shower enclosure are not only fabricated of vinyl for beauty and safety but are designed to run on a lower flexible track extruded of vinyl.

Using only a screwdriver and kitchen knife, the double doors, consisting of 5 ft. h'gh vinyl panels stretched taut and smooth in aluminum frames, can be installed to enclose any 5-ft. recessed tub. The lower vinyl track is first cemented to the bathtub rim. Mounting brackets are then cemented to opposite walls 59½ in. above the tub rim to hold the adjustable aluminum upper track. The lightweight doors are easily inserted into upper and lower track—and just as easily lifted out again when the tub is being cleaned or when it is being used to bathe children.

Once in place, the vinyl panels seal in shower spray and keep water from dripping or puddling on bathroom floors. Soap, shampoo oils, bath powders, or hot or cold shower spray can be splashed on the panels, but they will leave no stain, rust, or streaks when wiped off. Soft and flexible, yet tough and resilient, the vinyl panels give way under impact from arm, leg, or elbow, thereby eliminating much of the danger which may result in the case of accidental falls.

CREDITS: Vinyl panels based on Bakelite Krene are part of the Flexidoor Bathtub Enclosure produced by The Duraflex Corp., East Hartford, Conn.

Vinyl sliding door panels for shower enclosure seal in shower spray

Meets all specifications

NITROGEN DIVISION
ALLIED CHEMICAL

NITROGEN DIVISION

Glycols

Ethylene
Diethylene
Triethylene

Here's purity in Glycols high enough to meet all specifications—including even those of the plastics and synthetic fibres fields. Made at Nitrogen Division's new Orange, Texas, plant, these Glycols are unsurpassed in purity in commercial quantities.

Call on Nitrogen Division's experienced Technical Service Department for help in adapting these high-purity Glycols to your processes. Ethylene Glycol, Diethylene Glycol and Triethylene Glycol are all available in L.C.L. and tank car quantities. Ask for samples and quotations.

- Anhydrous Ammonia
- Ammonia Liquor
- Ammonium Sulfate
- Sodium Nitrate
- Methanol
- Ethanolamines
- Ethylene Oxide
- Ethylene Glycols
- Urea
- Formaldehyde
- Nitrogen Tetroxide
- U.F. Concentrate—85
- Nitrogen Solutions
- Fertilizers & Feed Supplements

NITROGEN DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

Hopewell, Va. • Ironton, Ohio • Orange, Tex. • Omaha, Neb.

STRAIGHT LINE STAMPING
of
NAME-PLATES, PARTS & NOVELTIES
made of
METAL OR PLASTIC

ask about
COLD and HOT COLOR STAMPING ATTACHMENTS

The famous ACROMARKER is used by thousands of companies all over the world for marking nearly any product that requires difficult lettering or numbering on every name plate or part. It is the "INDIVIDUAL-IZING" machine that makes marking and numbering extremely simple.

Write for full details.

Another one of the widely adaptable marking and numbering machines made by "The Original Marking Specialists."

The ACROMARK Company

5-15 MORRELL ST. ELIZABETH 4, N. J.

KEEP POSTED!

Come—and bring your key men—to the

25th EXPOSITION OF CHEMICAL INDUSTRIES

COMMERCIAL MUSEUM AND CONVENTION HALL

Philadelphia Dec. 5-9

Developments in the chemical process industries are rapid. What was new yesterday may be obsolete today. But you can keep up with new techniques, ideas, processes, methods, materials and equipment in an easy, time-saving way . . . by attending this great exposition with its over 500 fact-filled exhibits! *Just one idea you pick up here may profit you over and over again!*

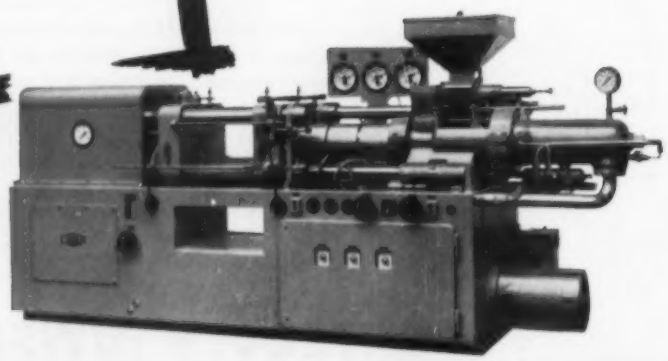
Don't miss this great opportunity! Save time by writing now for free advance registration and forms for hotel accommodations to

MANAGEMENT, INTERNATIONAL EXPOSITION COMPANY
480 Lexington Avenue, New York 17, N. Y.

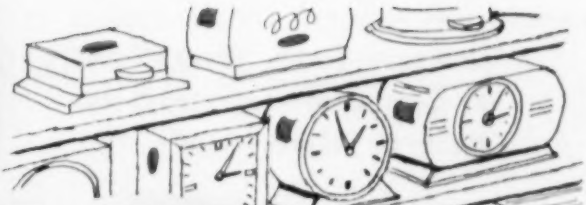
AUTOMATIC INJECTION MOLDING MACHINES

3 oz. 7 oz and 12 oz capacity

NETSTAL



MACHINE FACTORY AND FOUNDRY LTD., NETSTAL (SWITZERLAND)



DIME OR DOLLAR SIZE...

ROLL - DISPENSED

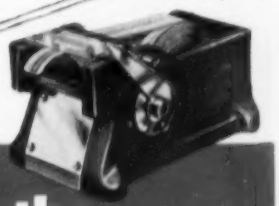
Pressure-Sensitive LABELS

YOUR Roll Label Printer is a specialist in this field. His specialized "know-how" is based on years of experience and study in connection with designing and printing *labels that sell!*

He prints on KLEEN-STIK pressure-sensitive paper stock, using specially-built equipment, to provide you with labels that will keep your production lines rolling at top speed. Practically any size . . . any shape . . . any stock — for fast, easy application without the use of water, glue or heat. For low-cost, high-impact labeling on your product or package, see your Roll Label Printer.

FREE! TEST-IT-YOURSELF KIT

Contains a selection of pressure-sensitive samples for on-the-spot testing in your own plant. Write today!



direct from the ROLL LABEL SPECIALIST of your choice

Pressure-sensitive roll labels in specially designed dispensers give you the *world's fastest known* method of hand labeling. Available through your Roll Label Printer in automatic, semi-automatic, or hand-operated models to suit every need.

KLEEN-STIK PRODUCTS, INC.

Pioneers in Pressure Sensitives for Advertising and Labeling

7300 WEST WILSON AVENUE • CHICAGO 1, ILLINOIS

Complete Service from Designing to Mold Making—

MACK CUSTOM MOLDED PLASTICS

• DESIGN COLLABORATION

• MATERIAL SELECTION

• TOOL MAKING

• QUALITY CONTROL

Over 35 Years of Specialization...

Mack custom Molding service is based on more than a quarter century of specialized production for industry. Full engineering assistance includes choice of materials, recommendations on design for maximum economy.

From Blueprints to Final Inspection...

Mack production is keyed to your requirements, assurance of deliveries that meet your assembly line schedules. Ask Mack to quote on your molded plastics, today. Please address: Mack Molding Company Inc., Wayne, New Jersey.

MACK

Since M 1920

MOLDED EXCELLENCE

MACK MOLDING COMPANY • INC

General Offices & Main Plant: WAYNE, NEW JERSEY

Other Plants at: ARLINGTON, VERMONT and WATERLOO, QUEBEC, CANADA

Have you tried the new GRAUERT twin products?

REG IMITATION GOLD

LNA IMITATION SILVER

for **HOT DIE STAMPING** on **PLASTIC SURFACES**

Samples forwarded promptly on request

RALPH W. GRAUERT, INC.

"Quality stamping leaf for every purpose"

100 Gold Street — New York 38, N. Y.

VOGT Vinyl EXTRUSIONS

Custom Service... Fast Delivery

6 POINTS OF SUPERIORITY

1. **DESIGN** Vogt engineers will carefully design the extrusion best suited to your job.
2. **COMPOUND DEVELOPMENT** Our plastic laboratory will develop a compound to meet your most exacting requirements.
3. **COLOR MATCHING** Our color matching experts will quickly match any color or shade with the greatest accuracy.
4. **DIE CONSTRUCTION** Without delay, our die shop will construct a perfect die.
5. **SAMPLES** Our sample department will rush a sample to completion for your approval.
6. **FAST, QUALITY PRODUCTION** Our production department will make volume deliveries of uniformly high quality extrusions in record time.

Whether you require tubings, rods, bindings, weltings, or special shapes, it will pay you to consult Vogt.

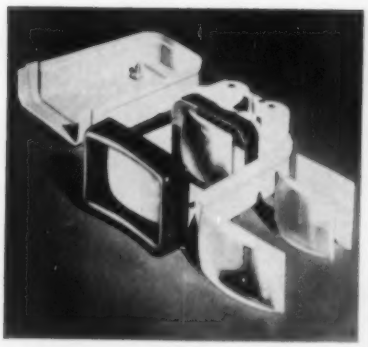
THIS 75-YEAR OLD FIRM SERVES:

Transportation • Refrigeration • Toys • Building • Agriculture • Chemical • Furniture

VOGT MANUFACTURING CORP.

100 Fernwood Ave., Rochester 21, N. Y. • Detroit Sales Office: 630 Lycaste Ave.

MAKERS OF VOPLEX PRODUCTS



Acrylic dual lens system for slide viewer is installed in styrene housing

Acrylic Lenses

GREATER enlargements and a realistic depth of view are obtained by the use of a dual acrylic lens system in a new 35-mm. slide viewer. The lenses, separated by only a few inches, are set into a 6 in. long housing molded in two parts of tough high-impact styrene. For added protection, the front lens is recessed ½ in. into the case.

As a result of using the dual acrylic lens system instead of the conventional bi-convex glass lens, the hand-held instrument gives a linear magnification of 5 times when held directly in front of the eyes and an area magnification of over 9 times at a distance of 18 in. from the eyes. The viewing window itself, measuring 2½ by 3¼ in., is large enough for simultaneous viewing by two people, making the viewer a valuable tool in research and industrial training as well as in the various fields of photography.

The use of acrylic for the lenses also contributes to keeping the retail price of the viewer within the range of standard viewers. The lenses can be generated to fine optical tolerances with a considerable saving in cost, since the hour-long grinding operations required for a glass lens is reduced to less than 2 min. for an acrylic lens providing magnification of equal quality.

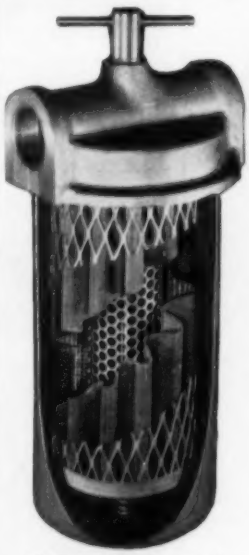
The primary lens is made from ½ in. thick clear sheet, the secondary lens from 0.625 in. thick material; both are set into a styrene frame.

CREDITS: Opta-Vue viewers are manufactured by Optics Mfg. Corp., Philadelphia, Pa., using Plexiglas sheet supplied by Rohm and Haas Co. Housing is molded by Auburn Button Works, Inc., Auburn, N.Y.

Here's What Users Have to Say About—

MARVEL Synclinal FILTERS

SUMP TYPE (Cutaway)



LINE TYPE (Cutaway)

Catalogs containing complete data available on request

U. S. STEEL CO., Irvin Works Three-Stand Cold Reduction Mill—"Marvel Synclinal Filters are a part of the mill's main hydraulic system which operates Coil Cradle as well as other hydraulic machines."

P. R. MALLORY PLASTICS, INC. Supt. of Maintenance Leo Paszkiet reports—"We have one injection molding press here that was giving me a lot of trouble. In order to maintain our 24-hour-a-day schedule, I had to stop it every two or three weeks to service the filters. It was a troublesome, time consuming job but it just had to be done. Even then, the machine never seemed to reach the productive capacity I knew it was capable of. Well, I had enough of that so I pulled out the original 3 filters and replaced them with three 50 G.P.M. Sump type, Marvel Synclinal Filters. That was over 10 months ago. During all this time the machine was operating faster and smoother than it ever had before. There was no more slow down of production due to pressure loss, vibration, pump starvation, etc. On the basis of these results, we are installing Marvels on every hydraulic machine in our plant, except of course, those on which Marvel Synclinal Filters were installed as standard equipment by the manufacturer."

Many others reporting similar results are now specifying **MARVEL SYNCLINAL FILTERS** on all new hydraulic equipment—and Standardizing with **MARVEL SYNCLINAL FILTERS** on all existing equipment.

For Dependable Protection on All Hydraulic and Other Low Pressure Circulating Systems

Investigate
MARVEL SYNCLINAL FILTERS
They Meet J. I. C. Standards

A SIZE FOR EVERY NEED

Available for sump or line installation in capacities from 5 to 100 G.P.M. Greater capacities may be attained by multiple installation (as described in catalog). Choice of monel mesh sizes range from coarse 30 to fine 200.

FILTERS FOR ALL TYPES OF FIRE-RESISTANT FLUIDS

Marvel's most recent development is a filter for the efficient filtration of all types of fire-resistant fluids.

WATER FILTERS

Both sump and line type filters have been adapted for use in all water filtering applications. No changes have been made in the basic, balanced, synclinal design.

IMMEDIATE DELIVERY!

As in the past, Marvel continues to offer Immediate Delivery!

MARVEL ENGINEERING COMPANY
7227 N. Hamlin Ave., Chicago 45, Ill.
Phone: JUNIPER 6-8023

Without obligation, please send me complete data on Marvel Synclinal Filters, as indicated:
- ☐ Catalog #106—For Hydraulic Oils, Coolants and Lubricants
- ☐ Catalog #300—For WATER
- ☐ Data on filters for Fire-resistant hydraulic fluids.

Name .....
Title .....
Company .....
Address .....
City .....
State .....

MP-11

VINYL PLASTISOLS

MICCROSOL, a product of Michigan Chrome & Chemical Company, is a true vinyl plastisol which can be readily adapted, through special formulation, to meet the strictest requirements for: dipping, casting, slush molding, etc.

We will be pleased to submit a sample of one of our many proven coatings, or engineer a vinyl plastisol for your product.

Send us full particulars.

Custom Engineered by

MICHIGAN CHROME & CHEMICAL CO.

MICCRO Products

8615 Grinnell Avenue
Detroit 13, Michigan

Depend on

AUTO-LITE

for Temperature Indication

You Benefit from *Eye-Level Readings*

Model F-1 temperature indicator

3-way adjustable mounting

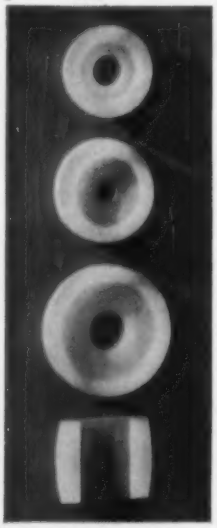
Auto-Lite offers many thermometer styles, permitting plant-wide temperature observation at low cost. Standard temperature ranges from minus 60°F to plus 750°F. Send for latest catalog showing various types.

Rigid stem or capillary tubing for EYE-LEVEL remote reading. Priced from $22.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

TEMPERATURE INDICATORS & RECORDERS

NYLON PLASTIC reduces kitchen noise!



Sinko Produces Nylon Parts That Give Years of Economical, Trouble-Free Service

Pictured are 3 Sinko Nylon cabinet rollers and a drawer skid-block that are being used successfully by several leading manufacturers of fine kitchen equipment. Sinko Nylon was selected after a series of exhaustive tests had proven its superiority in every respect. In one experiment a small drawer equipped with Sinko Nylon rollers was loaded and automatically operated the equivalent of a normal 200 years service. Upon examination the Sinko Nylon rollers showed little sign of wear.

You too should investigate the many advantages Sinko Nylon offers, among them—resistance to wear and to shock loads, to moisture, chemicals and to temperature; and its smooth-gliding, self-lubricating properties.

SINKO MOLDS ALL THERMOPLASTICS FROM 4 TO 60 OZ.

Sinko MANUFACTURING & TOOL CO.
3135 W. GRAND AVENUE • CHICAGO 22, ILLINOIS

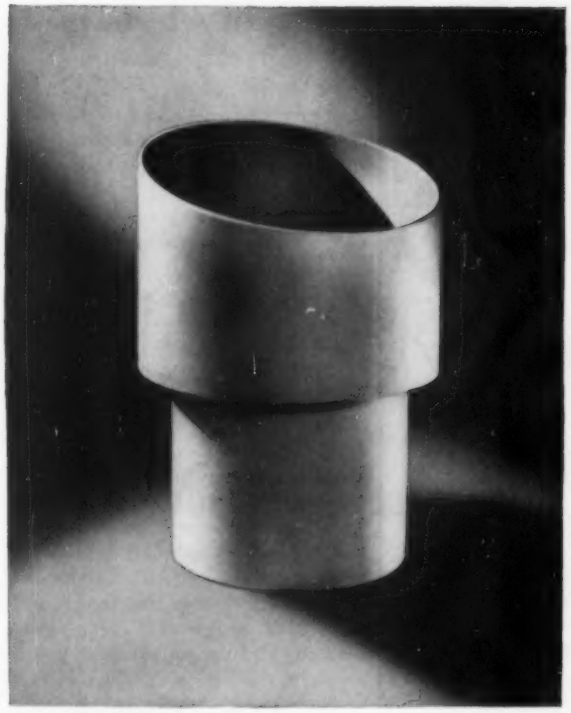
To make equipment more dependable, use C-D-F electrical insulation!

The reliable operation and long life of heavy electrical equipment often depends on insulating parts. A good supplier of insulation draws from past experience to make this possible—C-D-F has been a recognized industry leader since 1895! A good supplier expands his research and technical skill consistently—C-D-F offers the *widest range of electrical insulating materials*, from Vulcanized Fibre to C-D-F Products of Teflon.*

A BIG, RELIABLE SOURCE OF SUPPLY

As a designer or user of electrical equipment, you gain when your manufacturers work with C-D-F. Quality and dependability of electrical insulation, at reasonable cost, are guaranteed. The latest technical advances and ideas can flow freely between you and C-D-F's engineers. This page shows only a few of the many products C-D-F makes and fabricates for the electrical industry. Consult Sweet's Design File for catalog information, or call your C-D-F sales engineer (sales offices in principal cities)—you'll find he's a good man to know!

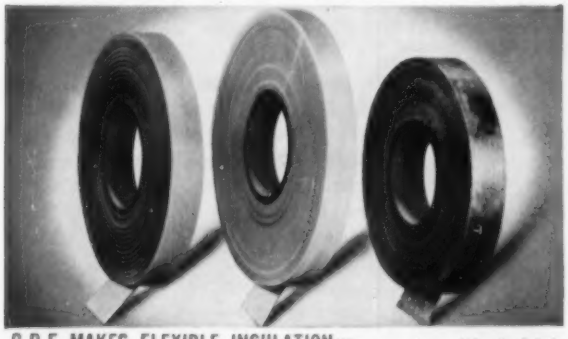
*DuPont Trademark



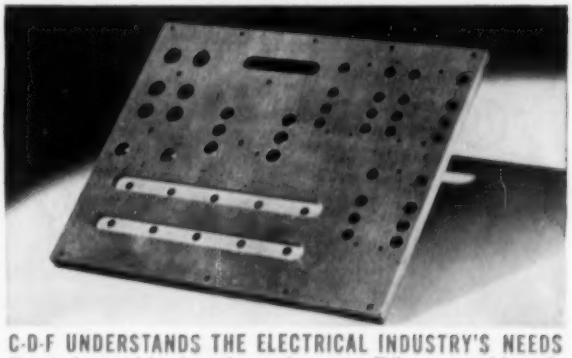
C-D-F HANDLES THE COMPLETE JOB An oil circuit breaker component is made from two Dilecto laminated plastic tubes, with a threaded ring joining the assembly. From raw materials to finish machining C-D-F does it all!

C-D-F Continental-Diamond Fibre

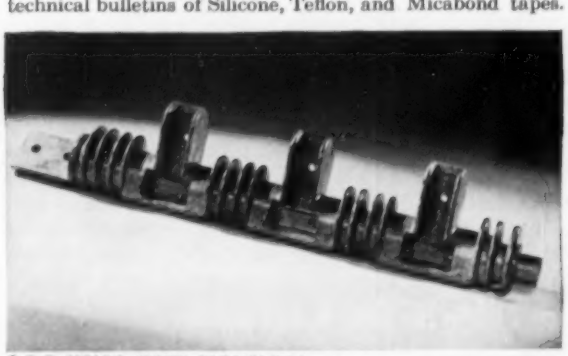
CONTINENTAL-DIAMOND FIBRE DIVISION OF THE BUDD COMPANY, INC.
NEWARK 28, DELAWARE



C-D-F MAKES FLEXIBLE INSULATION To meet critical high heat and electrical insulating needs, C-D-F makes these efficient, easy-to-apply tapes. Size range is wide, with latest resins and backing materials used. Write for samples and technical bulletins of Silicone, Teflon, and Micabond tapes.



C-D-F UNDERSTANDS THE ELECTRICAL INDUSTRY'S NEEDS Precisely machined to close tolerances, Dilecto panel boards guarantee dependable insulation, help designers save space. New 1955 Dilecto catalog is yours for the asking, lists all new grades.



C-D-F MOLDS MANY SPECIALTIES This shaft insulator for a circuit breaker is molded from C-D-F's cloth-based industrial thermosetting plastic, Celoron. Note complexity of mold, clean detailing. Celoron has high impact strength, is used in switchgear.

C-D-F GIVES YOU BETTER MOTOR AND GENERATOR INSULATION All these built-up and bonded mica products are made by C-D-F to provide uniform high-heat resistance and dielectric strength. All forms of Micabond are made for better performance and lower costs.

able-stik
NON-MOISTENING
labels

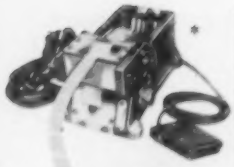
aid BARCLAY in *telling and selling*

Barclay Mfg. Company recognizes the values of identification of product and brand. They know, too, the importance of efficiency of application which explains why ABLE-STIK pressure sensitive labels were selected. ABLE-STIK offers the most modern, low cost method of labeling.

ABLE-STIK has an affinity to most surfaces . . . wood, metal, glass, plastic, rubber, composition . . . is easy to apply and equally easy to remove, without fuss or muss . . . requires no heat, water or glue for application . . . will stay in place until purposely removed.

You are cordially invited to join the growing number of manufacturers who are using ABLE-STIK, the modern method to apply and identify. ABLE-STIK is available either individually cut, die cut or in rolls for machine dispensing.
Our design and counsel services are available at no obligation or cost to you.

**For mass production operations we offer electric dispensers to deliver the label completely freed from the backing and ready for immediate application. A demonstration is yours for the asking.*



Ask for the "Blue Print to Modern Labeling" and our kit of ABLE-STIK samples.

allen hollander co., inc.

Dep't. MPL-11 • 385 Gerard Avenue • New York 51 • MOtt Haven 5-1818

"Gentlemen
Please send me . . .

It isn't necessary to write an individual letter for every booklet or brochure you want on a plastics subject.

By using the Manufacturers' Literature Page in this magazine, you can join the many readers who regularly ask for and receive the publications distributed by suppliers to the plastics field.

The Manufacturers' Literature Page is easy to locate in this issue, and easy to use. It's printed on heavy colored paper. All you do is circle the items you want, fill in the free reply card and mail. Before long you will receive the literature you have asked for.

Take advantage of this *free* service without further delay. Turn to the Manufacturers' Literature Page now!

A Service of **MODERN PLASTICS**
A BRESKIN PUBLICATION
575 Madison Avenue, New York 22, N. Y.

Mighty Beauty

(*From pp.* 85-90)

ring and zipper binders, table tops, and even electrical insulation.

Microveer is a new form of overlay laminate material produced by David Feldman and Assoc., Cincinnati, Ohio, by laminating polyester film to knife-cut fancy wood veneers 1/50 in. thick. The process is the subject of patent application.

Taking a completely new approach to the matter of decorative laminates for the furniture and architectural fields, Feldman is not trying to replace high-pressure melamine laminates but is opening up a complete new area of application for plastic-wood combinations. In the first place his laminate is absolutely flexible so is easy to handle. In the second place it is so low in cost that it will offer stiff competition to present methods of finishing woods. For example, a cabinet manufacturer buys a photographic reproduction of a wood grain for less than a cent a sq. ft. and then has to spend 27¢ a sq. ft. to make it into a laminate for his furniture tops; with Microveer, finishing on the job is eliminated. Furthermore it is real wood.

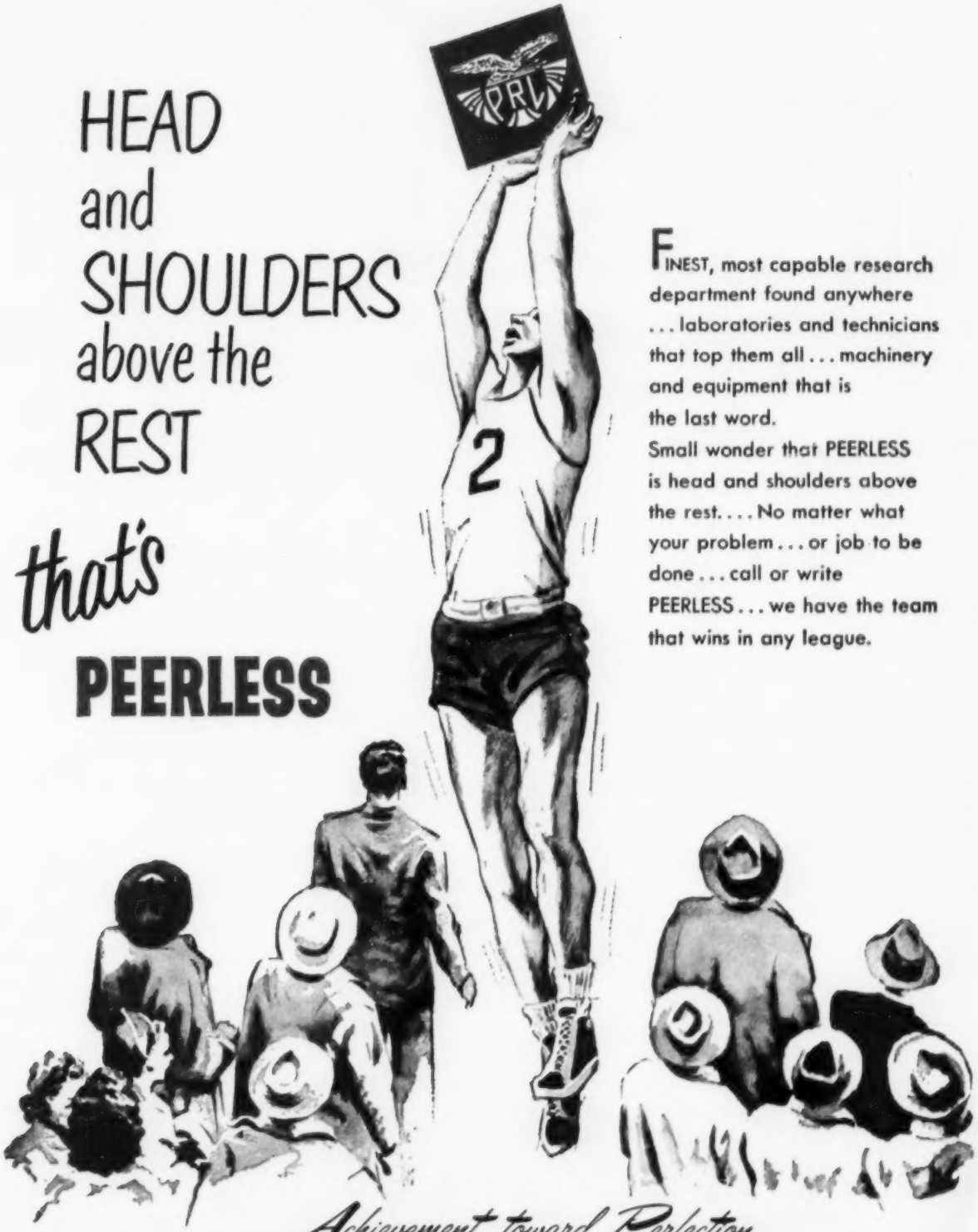
Admittedly the inherent hardness of Mylar polyester film surfaces on top of the wood veneer is less than that of melamine laminates and it has less heat resistance, but there are many applications in which high abrasion and heat resistance are not necessary. The polyester film preserves the natural grain and even the feel of the wood to an extent never before obtained in any way and since it is flexible, easily cut, and easily bonded to wood or metal surfaces with pressure-sensitive adhesives, it should have much potential not only in the furniture and architectural fields but also in the do-it-yourself market.

Laminated to aluminum foil by Alumiseal Corp., New York, the polyester film becomes a vapor barrier known as Zero Perm which is used as reflective insulation for commercial refrigeration where great tensile and impact strength, inertness, flex life, and thermal stability are required. The product is being used also for the dehumidified storage of war material where it is simpler and even cheaper to

(*To page* 224)

HEAD and SHOULDERS above the REST

that's PEERLESS



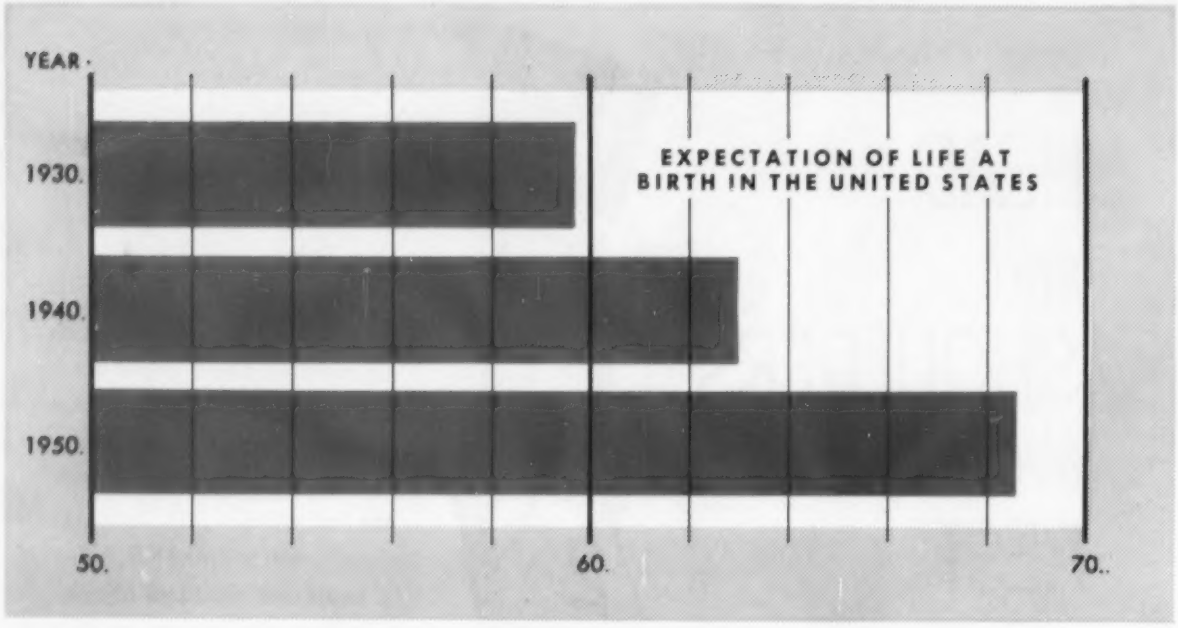
FINEST, most capable research department found anywhere ... laboratories and technicians that top them all ... machinery and equipment that is the last word.
Small wonder that PEERLESS is head and shoulders above the rest.... No matter what your problem ... or job to be done ... call or write PEERLESS ... we have the team that wins in any league.

Achievement toward Perfection

PEERLESS ROLL LEAF COMPANY, INC.

4511-4513 New York Ave., • Union City, N. J.

BRANCH OFFICES: BOSTON • CHICAGO • *Peerless Roll Leaf Division* • GANE BROS. & LANE, INC.
REPRESENTATIVES: ST. LOUIS • LOS ANGELES • SAN FRANCISCO • LOUISVILLE • MONTREAL • LONDON, ENG.



WHAT IS THE LIFE EXPECTANCY

. . . *of YOUR PLASTIC?*

High volatile monomeric plasticizers used twenty years ago resulted in very short lived plastics. Technological advances, primarily in the kinds and types of plasticizers used, have allowed longer life to be built into plastics.

HARFLEX® 300 is a new and truly permanent plasticizer developed by Harchem. It is used alone for plasticizing PVC resins, eliminating the need for fugitive plasticizers.

Plastics made with HARFLEX® 300 as the sole plasticizer have a given tensile strength with the use of less material, are non-migratory, and have excellent low temperature properties.

HARFLEX® 300, when used in your product, results in quicker blending and easy processing. It can be the answer to one of your problems. Write for a sample and full information.

SEBACATES
PHTHALATES
ADIPATES

HARCHEM

the key to HARCHEM better plastics

HARCHEM DIVISION

WALLACE & TIERNAN, INC.
25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

1. SELECT the items you want
2. CIRCLE the corresponding numbers on the post card
3. FILL IN the information requested
4. MAIL — no postage required

HELPFUL LITERATURE FREE

There is valuable data — worth dollars and cents to you — in the literature and samples described below.

EQUIPMENT • SUPPLIES • SERVICES

MODIFIED POLYSTYRENE. Booklet describes types of modified polystyrene produced by this company, mentions applications, discusses methods of forming and finishing and lists properties. Koppers Company, Inc. (K-501)

PLASTICIZERS IN VINYL RESIN PLASTISOLS. Technical bulletin discusses use of DOP, DIOP, and DCP plasticizers in producing plastisols from vinyl chloride resins. W. C. Hardesty Co., Inc. (K-502)

COMPATIBILITY OF POLYAMIDE RESINS. Technical bulletin contains tables listing hot and cold compatibility of company's polyamide resin with several hundred plasticizers, modifiers, and other resins. General Mills. (K-503)

GLASS FABRICS. File folder contains reprints of four articles concerned with the use of glass fabrics in plastic laminates. Also contains technical information, prices, and sample of company's "Rovcloth" woven glass. Bigelow-Sanford Carpet Company, Inc. (K-504)

RIGID POLYVINYL CHLORIDE. Booklet discusses "Seilon" unplasticized polyvinyl chloride sheet material. Gives fabricating information and tables of physical properties. Seiberling Rubber Co. (K-505)

METHODS FOR MOLDING REINFORCED PLASTICS. Booklet discusses use of "Vibrin" polyester resins in constructing plastic car bodies, lists physical and chemical properties, and gives graphs of accelerated cure characteristics. Naugatuck Chemical. (K-506)

TRANSPARENT SHEET MATERIALS. Data sheets offer detailed information about the properties and applications of company's line of cast transparent sheet materials. Line includes both thermosetting and thermoplastic varieties possessing a wide range of electrical, optical, physical, and chemical properties. The Polycast Corporation. (K-507)

CONCENTRATED COLOR DISPERSIONS. Collection of technical bulletins give information on use of company's concentrated dry color dispersions in nylon, vinyl, polyesters, polyethylene, and polystyrene resins. Also lists paste dispersions for vinyl compounds. Acheson Dispersed Pigments Co. (K-508)

WEIGH FEEDER FOR INJECTION MOLDING MACHINES. Folder describes automatic net weighing machine, designed to weigh-feed a pre-determined amount of plastic molding material to injection molding machines. Specifications and dimensions are included. The Exact Weight Scale Co. (K-509)

DEODORIZERS FOR PLASTICS. Brochure describes series of automatic agents designed to disguise or mask objectionable odors of plastic materials and compounds. Sindar Corp. (K-510)

CUTTING MACHINES FOR PLASTICS. Literature describes a line of cutting machines that includes straight knife and circular knife machines for cutting vinyl and other film and sheet materials. Eastman Machine Co. (K-511)

ELECTRONIC SEALING EQUIPMENT. Bulletin describes line of six electronic heat sealing units with capacities of ½, 1, 2, 3½, 5, and 7 kilowatts. Also shows two sealing presses. Generator and press specifications included. J. A. Callanan Co. (K-512)

SINGLE REWIND SLITTER. Folder illustrates and describes single rewind slitter, available with rotary or razor blades, designed to slit 2 to 40 gauge roll stock in widths up to 78 in. in rolls as narrow as ½ inch. Center Tool & Mfg. Co. (K-513)

STEEL FOR MOLDS AND DIES. Bulletin describes properties, analysis, heat treating data, and applications of "Speed Case" open hearth, low carbon steel plate. Suggested uses include molds and dies. W. J. Holliday & Co., Inc. (K-514)

FINISHING TOOL. Literature describes the "Di-Profiler," a flexible shaft for performing such hand finishing operations as filing, honing and polishing molds and dies. Extensive list of accessories for tool also listed, with prices. Engis Equipment Co. (K-515)

ELECTRONIC PREHEATER. Data sheet gives specifications and features of model "34-A" electronic preheating machine, with heatability of 3 to 4 pounds of material per minute, 5 kw. maximum power output. W. T. La Rose & Associates, Inc. (K-516)

MACHINES FOR COLOR MIXING. Folder gives specifications and prices of a drum tumbler used for dry color mixing (models with ½, 1, and 2 h.p.), and a hex barrel tumbler, used for mixing wetted color concentrates (models with ½, 1, and 3 h.p.). Injection Molders Supply Co. (K-517)

STABILIZERS. Bulletin contains suggested vinyl stabilizer combinations for plastics coating, molding, forming, and dip coating applications. The Harshaw Chemical Co. (K-518)

REINFORCED PLASTICS ADDITIVE. Literature details the properties, functions, and uses of "Cab-O-Sil," a silicon dioxide additive for polyester-glass reinforced plastics that impedes resin drainage, prevents resin-deficient areas, controls resin consistency. Godfrey L. Cabot, Inc. (K-519)

ELECTRONIC HEAT SEALER. Booklet gives detailed specifications of the "Experdo," a new 1.5 kw. electronic heat sealer. Machine's features include convenience of operation. Montan Export, Inc. (K-520)

PLASTIC EXTRUSION DIES AND EQUIPMENT. Catalog contains information on equipment for sheet extruding (die, haul-off, shear, sheet stacker, combination unit), pipe extruding (die, pull-off, coiler, conveyor, cooling tank), and monofilament extruding. Robbins Plastic Machinery Corp. (K-521)

STOCK NYLON SUPPLIER. Catalog sheets give dimensions and prices of extensive line of stock nylon slab, sheet, rod, and stripping stock. Colonial Kolonite Co. (K-522)

Fill out and mail this card now

MODERN PLASTICS

Manufacturers' Literature Service

I am interested in the following items:

K-501 K-502 K-503 K-504 K-505 K-506 K-507 K-508 K-509 K-510 K-511
K-512 K-513 K-514 K-515 K-516 K-517 K-518 K-519 K-520 K-521 K-522
K-523 K-524 K-525 K-526 K-527 K-528 K-529 K-530 K-531 K-532 K-533
K-534 K-535 K-536 K-537 K-538 K-539 K-540 K-541 K-542 K-543 K-544

If you do not now subscribe to MODERN PLASTICS, but wish to receive the next 12 issues (U.S.A. & Canada, $6 Pan America, $10; all others, $15) just check here ☐

NAME ..... ***POSITION*** .....
(Please Print Plainly)

COMPANY .....

STREET ..... ***CITY*** ..... ***STATE*** .....

(This card cannot be honored after February 1, 1956)

FREE HELPFUL LITERATURE

There is valuable data—worth dollars and cents to you—in the literature and samples described below.

1. SELECT the items you want
2. CIRCLE the corresponding numbers on the post card
3. FILL IN the information requested
4. MAIL—no postage required

EQUIPMENT • SUPPLIES • SERVICES

PLASTICIZERS FOR VINYLS. Booklet describes three plasticizers formulated for use with vinyl resins. Lists their chemical and physical properties, and typical physical properties of vinyls after plasticizing. B. F. Goodrich Chemical Co. (K-523)

POLYESTER MOLDING COMPOUNDS. Leaflet gives information on "Fibercore" polyester molding compounds, including part and mold design considerations, molding information, shelf life, and applications. Plumb Chemical Corp. (K-524)

VACUUM FORMING MACHINE. Illustrated brochure gives detailed description, operating instructions, applications, and list of materials usable with line of drape and vacuum forming machines. Auto-Vac Co. (K-525)

COLORS FOR POLYESTER RESINS. Literature lists physical data, sources of supply, and prices for line of paste colors for polyester resins. Samples of colored sheet stock included. Ferro Corp. (K-526)

PLASTIC ENGRAVER. Bulletin describes two models of hand-operated pantographic engraving machine for decorating and marking sheet plastics. Available type faces are illustrated. H. P. Preis Engraving Machine Co. (K-527)

CUSTOM INJECTION MOLDING. Literature describes facilities and services of custom injection molder. Services include engineering, mold-making, production, finishing, and assembly. Tri-State Plastic Molding Co., Inc. (K-528)

NEW POLYETHYLENES. Company offers reprint from Modern Plastics that discusses properties, fabrication methods, and application potentials of newly developed types of polyethylenes. American Agile Corp. (K-529)

GRINDING MILL AND MIXER. Brochure describes "Entoleter" impact mill and centrifugal mixer, available in five models from 15 to 40 h.p. and with approximate maximum capacities of 27,000 to 80,000 lbs. per hour. The Saftey Car Heating and Lighting Co., Inc. (K-530)

STABILIZERS FOR VINYLS. Booklet gives data on properties, performance characteristics, and uses for line of stabilizers. Includes recommended formulations for calendered film and sheeting, extrusions, plastisols and organosols, rigid vinyls, and floor tile. Argus Chemical Corp. (K-531)

PLASTICS PROPERTIES CHART. Chart lists physical and chemical properties of thermoplastic materials supplied by this company in stock tube, rod, and sheet forms. Commercial Plastics & Supply Co. (K-532)

PVC RESIN. Data sheets give technical information on two types of general purpose polyvinyl chloride resin. Diamond Alkali Co. (K-533)

HEAT SEALING EQUIPMENT. File folder contains catalog sheets describing a line of electronic heat sealers, preheaters, generators, turntables, arc suppressor, and other heat sealing accessories. Radio Receptor Co., Inc. (K-534)

PLASTICS PROCESSING MACHINES. Catalog gives information on company's line of intensive mixers, roll mills, transfer and compression presses, and 3- and 4-roll calenders. Stewart Bolling & Co., Inc. (K-535)

STOCK KNOBS AND HANDLES. Illustrated 12-page catalog gives detailed dimensions and specifications on extensive stock of knobs, push buttons, handles, dials, and pointers. Kurz-Kasch, Inc. (K-536)

MOLD RELEASE LUBRICANT. Sheet gives properties, directions for using and prices of "Mold-Wiz" mold release lubricant. Free sample included. Axel Plastics Research Laboratories. (K-537)

CUSTOM MOLDING SERVICE. Brochure describes plant facilities of this custom injection molder, presents several case histories of difficult and unusual molding jobs. Nosco Plastics, Inc. (K-538)

FATTY ACIDS AND DERIVATIVES. File folder gives latest specifications for line of products that includes stearic acids, oleic acids, hydrogenated fatty acids and glycerides, animal and vegetable fatty acids, special fatty acids, plasticizers, and oleic esters. Emery Industries, Inc. (K-539)

HEAT SEALING DIGEST. House organ contains technical and engineering information of interest to users of heat sealing equipment. Company offers free subscription. Kabar Manufacturing Co. (K-540)

POLYVINYL ACETATE EMULSIONS. Folder gives special features, physical properties, and typical end uses for four polymers and four copolymers of vinyl acetate. Dewey & Almy Chemical Co. (K-541)

FAR-INFRARED HEATERS. Folder explains how high efficiency, far-infrared heaters are used to provide uniform heat for softening, curing, drying, and otherwise processing plastics resins and materials. Edwin L. Wiegand Company. (K-542)

POLYESTER RESINS. Booklet lists physical and chemical properties of "Polylite" line of polyester resins, discusses their use in various molding methods, illustrates step-by-step production of airplane using lay-up method. Reichhold Chemicals, Inc. (K-543)

PLASTIC PIPE AND FITTINGS. Catalog gives specifications and details on physical and chemical properties of company's line of PVC pipe and fittings. Colonial Plastics Mfg. Co. (K-544)

Fill out and mail this card now

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit 3656 (Sec. 34.9, P.L. & R.), New York, N.Y.

MODERN PLASTICS

Village Station Box No. 103

NEW YORK 14, N. Y.

MYLAR* makes possible "smooth-surface" acoustical tile

MYLAR* offers you almost unlimited opportunities for product development

New Du Pont "Mylar" polyester film is used as the facing on the Owens-Corning Fiberglas Sonofaced** Acoustical Tile shown—"Mylar" makes possible the only smooth-surfaced acoustical tile on the market.

"Mylar" acts as a vibrating membrane, effectively transmitting sound to the Fiberglas absorbent. And with "Mylar" as the facing, dust and dirt can't collect on the smooth surface—Sonofaced Tile can be easily cleaned with soap and water . . . never needs repainting. This new development fills the need for an acoustical material with high sound absorption, good light reflection, and a smooth, easily maintained finish. Any number of color combinations and patterns are possible, using printed "Mylar."

This is just one example of the way Du Pont "Mylar"—with a combination of physical, electrical, chemical and thermal properties never before available in a plastic film—is making possible better products and lower costs in an amazing variety of fields. You, too, may be able to use "Mylar" to advantage—only a little research imagination may be needed to show you where. Mail the coupon for your free copy of a booklet that tells you more about this versatile film—and the ways it may help you develop a new product, improve an old one.

*Registered Du Pont trade-mark for its brand of polyester film.
**Registered Owens-Corning Fiberglas trade-mark.

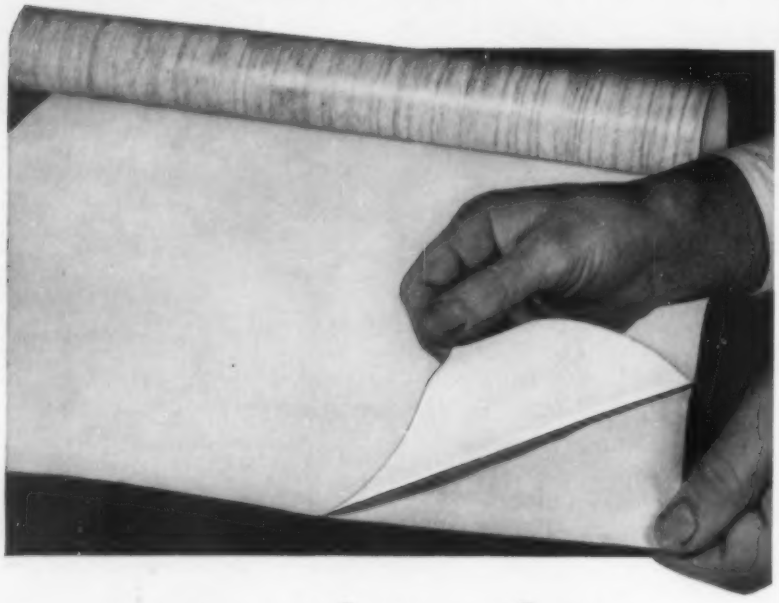
DU PONT
MYLAR®
DU PONT POLYESTER FILM
Reg. U. S. Pat. Off.
Better Things for Better Living...through Chemistry

E. I. du Pont de Nemours & Co. (Inc.)
Film Department, Room M-11, Nemours Bldg.
Wilmington 98, Del.

Please send me sample and further information on "Mylar" polyester film.

Name_____
Firm_____
Street Address_____
City_____ State_____

Patapar Releasing Parchments



...easy release from self-adhesive plastics

New high standards of "releasing" action have been achieved by special types of Patapar Vegetable Parchment. These releasing Patapars have dense, fibre-free surfaces. They release readily from a wide variety of pressure-sensitive adhesives and tacky surfaces.

In the manufacture of corrugated polyester fiberglass sheets, Patapar is the ideal backing material – gives "satin" finish.

Patapar Releasing Parchments have high resistance against penetration or migration of oil, adhesives and softeners. Their releasing action is unaffected by passage of time. Their low cost will save you money.

Furnished plain or printed with product identification, instructions or selling message. We do the printing.

SEND FOR TESTING SAMPLES. A brochure containing technical information and samples of various types of Releasing Patapar is yours for the asking. Write us today telling the application you have in mind.

Patapar
Vegetable Parchment
HI-WET-STRENGTH · GREASE-RESISTING

HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

use than the old cocoon vinyl-spray method. Undoubtedly it will also have a future in specialized packaging.

Adhesives and Bonding

Present polyester film cannot be heat-sealed to itself, which is one reason why the coatings and laminations are so important.

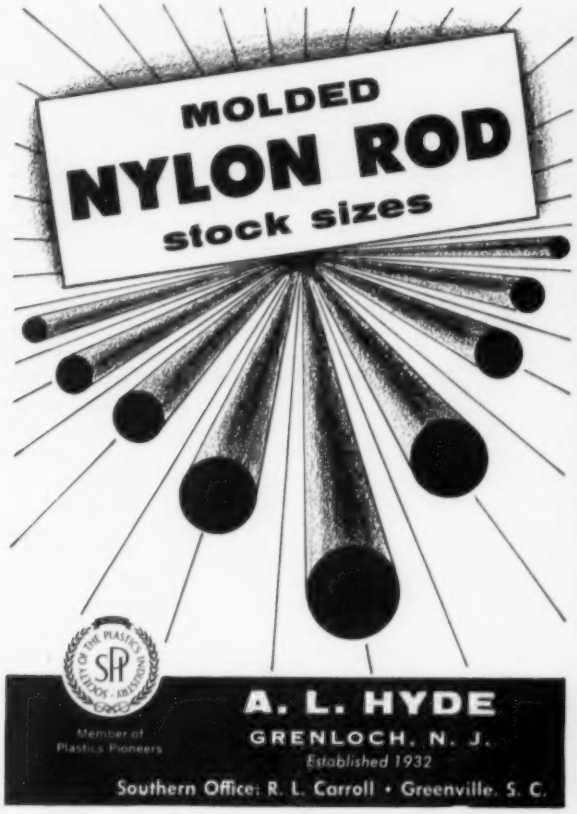
Benzyl alcohol, a solvent which is used with heat, makes it possible to seal the film to itself. But there is no dearth of thoroughly tested adhesives, and Du Pont has a comprehensive technical report listing adhesive products recommended by nine manufacturers. They include a variety of lacquers, emulsions, and cements.

Dyeing Polyester Film

While to date most polyester film has had color applied literally by roller printing or has had coloring in the adhesive used in laminating, a new and continuous method of dyeing all gages with colors that penetrate and become part of the film by itself has been developed by Julius Hermes, president of Martin Processing Co., Martinsville, Va. The method dyes the film in colors and shades ranging from delicate transparent pastels to jet black, using Du Pont dyes especially produced for this process. The film is first dyed, then washed in boiling soapy water, then rinsed in clear water, and then finally dried. The dyed film has definite advantages for metallizers as well as for the electrical industry, which uses color-coated insulating materials. The dyed film is heat-stable and can be redyed to darker colors.

Another intermediate service that is performed on Mylar is the abrading of the surface by grit blasting in order to give it a mat appearance. This work is performed by Tru-Scale Co., Wichita, Kan.

From all present indices, there will not be in the near future any abatement of the excitement surrounding this fabulous polyester film. Company after company in all fields of manufacture and processing is engaged in intense research in the hope of producing better products, more beautiful products, or lower cost products with it. As production increases, the cost will come down; as research proceeds more markets will open.—END



Member of Plastics Pioneers

A. L. HYDE
GRENLOCH, N. J.
Established 1932
Southern Office: R. L. Carroll • Greenville, S. C.

FOR UNIFORM COLOR DISPERSION

TENITE
POLYETHYLENE
an Eastman plastic

EASTMAN CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE
subsidiary of Eastman Kodak Company

SOME OF ITS MANY USES IN *Plastics Laboratories*

Testing single-cavity molds
Molding color samples.
Production of samples.
Plastics instruction and demonstration.
Metallographic mounting.
Metal insert mold tests.
Vulcanizing.
Drawing.
Forming.
Embossing.
Bonding plywood.
Testing tensile properties.
Testing compressive properties.
Testing shear strength.
Flow tests.
Crushing tests.
Breaking tests.
Determining heat cycles.

THE CARVER LABORATORY PRESS

the Standard Press of Many Uses...
...complete with Accessories for General Research
Some of the Many General Applications...continued
...for Quick—Accurate—Small Scale Tests
Send for Complete New Catalog

Send for your copy of this new handy-size manual containing up-to-date information on the Carver Laboratory Press and its many uses.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
3 CHATHAM ROAD, SUMMIT, N. J.

Send catalog, describing Carver Laboratory Press and Standard Accessories.

NAME .....
FIRM .....
ADDRESS 115

No name is better known on bicycle saddles than Mesinger because the H. & F. Mesinger Company has a way of being first with new saddle improvements, like their new models with one-piece molded vinyl tops by Stanley Chemical. Thanks to this waterproof, temperature-proof, and virtually wear proof material, conventional fabric-covered and leather saddles are losing their appeal. Leading cycle manufacturers were quick to take notice, and today more and more cycling Americans saddle up on a Mesinger for the softest, smoothest ride ever. This is only one of many custom vinyls by Stanley that are making products everywhere look better and sell better. How about yours? Write for literature to 71 Berlin St., East Berlin, Conn.

STANLEY CHEMICAL

CUSTOM VINYLS FOR PROTECTIVE COATINGS

Vinyl Sheet

(*From page 91*)

for vinyl sheet upon being subjected to calendering.

Anti-oxidants are added to Chemigum latex during its manufacture to protect the dry film from brittleness during aging so that fabrics saturated with the latex may have a long life.

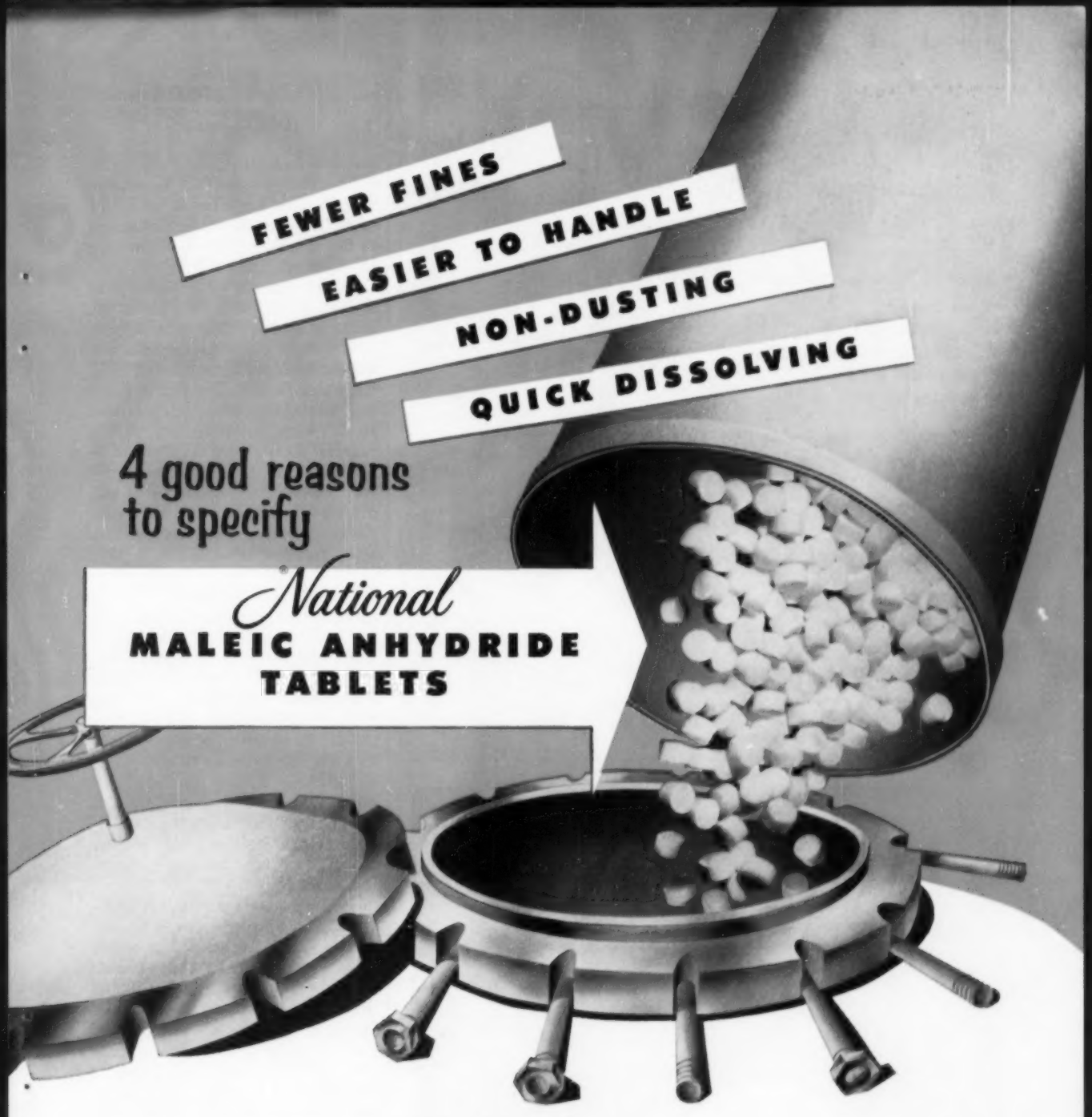
Chief advantages in using non-wovens such as Lantuck as backing for vinyl sheet in automobile upholstery are: 1) elimination of "clothy" appearance caused by conventional woven backings, while providing necessary support and elasticity; 2) savings resulting from simplified production methods and elimination of costly wadding materials and adhesives; and 3) greater support to the vinyl sheet as a result of the reinforcing characteristics of the random fiber distribution in the non-woven fabric. To combine Lantuck non-woven fabric with vinyl sheet, three methods may be employed—coating directly on the calender; electronic welding or quilting; and laminating.

The non-woven fabric for calendering use may be made from cotton or a combination of synthetic fibers. It is handled in the manner used in conventional calendering where vinyl is combined with fabric.

For electronic welding or quilting, a lighter weight fabric made from 100% cotton is normally used. Three separate rolls are employed in quilting. They feed preformed vinyl sheet, fibrous wadding, and Lantuck, from top to bottom, into an electronic quilting machine. The electronic quilter operates by the generation of heat created by radio frequency in a "stamp-move" system which combines the three materials, as well as embosses them with the quilt pattern of the stamp bar.

Lamination involves Lantuck and preformed vinyl sheet on separate rolls. After heating the interior surfaces, the materials are fed between two pressure rolls and combined. After roll-up, this laminated fabric may be embossed separately.

It has been predicted by H. R. Thies, general manager of the Chemical Div., of Goodyear, that non-woven fabrics will be used as backing in virtually all automobiles in 1956.—End



4 good reasons to specify

National MALEIC ANHYDRIDE TABLETS

These are the solid reasons why National Maleic Anhydride Tablets are setting the new standard of excellence for the industry.

Qualitative screen-analysis proves these tablets have up to 90% fewer fines "as delivered". Quick dissolving, uniform, easier-to-handle National Maleic Anhydride Tablets are the best value your money can buy. And there's no price premium on this premium product.

You can cut inventory, too. Our modern new plant on the Ohio River at Moundsville, W. Va. makes swift delivery by rail, truck or inland waterway. We'll be pleased to send you samples, specifications and prices.

Allied Chemical

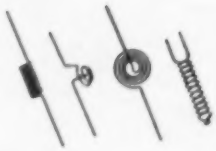
NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Boston Providence Philadelphia Chicago San Francisco
Portland, Ore. Greensboro Charlotte Richmond Atlanta
Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto

For Quality Vacuum Metallizing Use certified Union City Tungsten Coils

with these important features

- fast flashing
- high evaporation capacity
- uniform metal-vapor distribution
- long useful coil life
- minimum coil breakage



Efficient, long-lasting Union City Tungsten Coils are sure to increase the profit from your vacuum metallizing operation because our engineering staff will work with you to design the *right* coil for your needs. We'll make the coils, single or stranded wire construction, or supply cut lengths or wire on reels so you can prepare your own coils.

If you would like sample coils and quotations, call or write today.

UNION CITY FILAMENT CORP.

540 Thirty-ninth St. Union City, New Jersey

for EXTRUDERS · PLASTICIZERS · STRAINERS · TUBERS
Xaloy LINERS
longer life at less cost
Xaloy liners and integral tuber barrels outlast all others, increase production output, reduce servicing—provide lower product costs.
Write for your copy of Xaloy Engineering and Production Data Book
Xaloy
CONTRIBUTING TO INDUSTRY PROGRESS
INDUSTRIAL RESEARCH LABORATORIES
DIVISION OF HONOLULU OIL CORPORATION
961 East Slauson Avenue · Los Angeles 11, California

Polystyrene

(*From pp. 92-97*)

can save time by buying and serving them. The product in a nearby "blind" package may be of equal quality, but the fact is not apparent to the consumer until the container has been opened.

Recent surveys have shown that under today's self-service merchandising of food products, with patrons free to roam the shopping aisles and choose whatever strikes their fancy, the old-time shopping list is going into the discard. More and more consumers enter the store with only a general idea of what they intend to buy; this puts a premium on packages having the ultimate in appeal. For many products, a molded transparent polystyrene container proves to be the most effective.

Wooden Baskets Replaced

In addition to prepared foods, there are various other food items which lend themselves to packages composed at least in part of molded polystyrene. Two of the best examples of such packages are specially molded frameworks, in which tomatoes may be wrapped in cellophane or cellulose acetate for six-sided visibility, and molded berry baskets which have many points of superiority over the familiar wood veneer baskets used for blueberries, strawberries, etc.

Special containers for select tomatoes are now being produced by several molders. Consisting essentially of a strong but light framework which helps to "cradle" the fruit and shield it against damage in transportation and handling, these molded polystyrene packs also provide support for the transparent wrapping material used. Available in both two- and four-tomato sizes, these packages, unlike the paper trays also used for this purpose, provide complete product visibility for the shopper who wants to make certain she is getting perfect fruit. After tomatoes have been placed manually within the transparent plastic framework, the unit may be run through automatic wrapping equipment if desired. Since the "skeletons" are delivered to the packer nested, they require relatively little storage space and also need no setting up prior to filling and wrapping. Designed specifically

for the tomato packs and having no particular re-use angle, they are merely discarded after use.

Spoilage Reduced

The molded polystyrene berry basket is another excellent example of designing to meet a specialized packaging problem. When berries are packed in conventional paper or wood veneer baskets, spoilage is frequent, due to the presence of bacteria in the packaging material. In addition, these baskets fail to provide adequate ventilation for passing off moisture and carbon dioxide. And, at the same time, they again cover up too much of the fruit and thus do not lend themselves to appetizing displays which produce impulse sales.

These colorful molded polystyrene baskets, now being produced in various sizes by several molders, have been in production for several years. Their use is not limited to fruit but may also be advantageously extended to candy, cookies, meats, frozen foods, and other items to provide an extra touch of color which sets off the eye appeal of the product itself and paves the way to increased sales. Fresh berries remain in better condition in these packages because they provide much more complete ventilation. Berries packed in the plastic baskets may not only be fully inspected by the housewife prior to purchase, but may also be conveniently washed right in the basket.

Very light in weight (a dozen pt. baskets of one type tip the scale at just over 4 oz.), the baskets have been molded at various times of regular, reground, and, more recently, high-impact polystyrene material. Hot-runner molds and automatic injection equipment have been used to obtain rapid, economical production of these competitive containers.

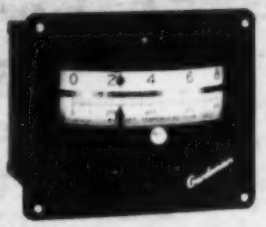
For Non-Food Products

Polystyrene containers, both stock and custom molded, are making rapid progress in connection with non-food products. One cannot make a trip through a drug store, variety, hardware, sporting goods, or department store without being impressed by the number of products now displayed and sold in attractive molded polystyrene packages. Although a complete listing of such products is beyond the scope of this article, those cited in the following paragraphs

(To page 232)

"Custom Built for Plastics"

Gardsman TUBELESS* TEMPERATURE-CONTROLLERS



Model JP Series
PROPORTIONING Controllers

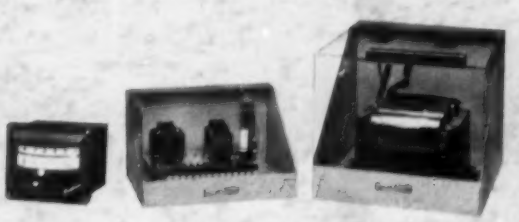
This time-proved unit is widely used for closer control than the basic On-Off system permits. JP *anticipates* temperature changes, tends to stabilize the system to desired temperature, makes new harder-to-mold materials a simple production job.

Model JPT Series
3-POSITION Proportioning Controllers

Designed especially for plastic extruding and injection molding machines, to control heating of barrel or cylinder, and cooling with either air or water. Ideal for high-friction materials like Rigid Vinyl. Provides Model JP Proportioning Control of heaters *plus* automatic control of cooling cycle *only* in case of overshoot caused by heat of friction or temporary shut down. Avoids heat-waste and decomposition of plastic materials.

Model JS Series
STEPLESS Controllers

Closest practicable control, virtually eliminates temperature variable. Constantly modulates input to demand. Prolongs heater life by reducing thermal shock. No tubes, no relays. Multi-load units, adjustable control-band width, manual reset. Simplest operation: one knob.



Minimum maintenance. No need for "fussing" to suit tube-ageing. Reliable — Guaranteed — AND these Gardsman Controllers save on original cost! Specify model series in writing for data.

4339 W. Montrose Ave.
Chicago 41, Illinois

WEST Instrument CORPORATION
CHICAGO
SALES OFFICES IN PRINCIPAL CITIES

Celanese

CORPORATION OF AMERICA

Announces

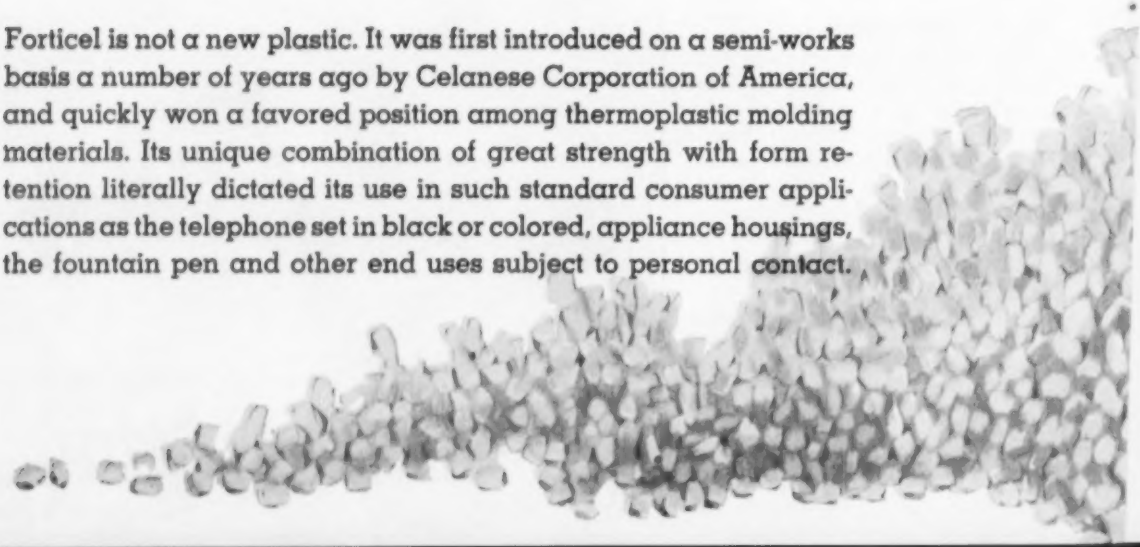
the first commercial production of

FORTICEL*

(CELLULOSE PROPIONATE PLASTIC)

High Performance Thermoplastic Molding Material with Outstanding Range of Balanced Properties... Available in Choice of Colors and Formulations

Forticel is not a new plastic. It was first introduced on a semi-works basis a number of years ago by Celanese Corporation of America, and quickly won a favored position among thermoplastic molding materials. Its unique combination of great strength with form retention literally dictated its use in such standard consumer applications as the telephone set in black or colored, appliance housings, the fountain pen and other end uses subject to personal contact.



An Overnight Reputation

Applications like these quickly put Forticel in the forefront position among thermoplastic molding materials. Forticel had the qualities needed by molder and manufacturer. In addition to its toughness and dimensional stability, this cellulosic plastic possesses unusual weatherability, surface beauty and permanence, color, and, perhaps as important as anything else, Forticel is free of objectionable odor.

A Molder's Plastic

In molding performance, Forticel is outstanding. Flow temperatures are not as critical . . . welds are stronger . . . surface details of molded parts are superb . . . flash lines are all but invisible . . . molded surfaces are lustrous, and require little or no buffing or polishing . . . molded-in metal inserts hold firmly.

A Fabricator's Plastic

Forticel also machines well. It can be sawed, cut, drilled, threaded and punched with far less danger of stress lines and crazing. This machinability is of vital importance in such applications as fountain pens and mechanical pencils, toothbrush handles and scale model trains, and appliance housings.

First Production of Forticel Stopped

When originally introduced, Forticel was produced in a pilot plant operation. And, because of the difficulty of obtaining raw materials of acceptable quality and cost, commercial production was delayed until such a time as raw materials could be produced in volume—at a price that would insure a competitive position for Forticel.

Production of the New Forticel Begun

After continued development, the new Forticel is currently moving into full scale production. More important to molder and manufacturer is the news that the raw materials of Forticel are *Celanese produced*—and in volume!

New Facilities For Forticel

To be certain that the supply of Forticel raw materials will be adequate to meet the anticipated demand for this outstanding plastic, Celanese has installed new facilities for their production. This will insure a dependable source of supply. These facilities will produce Propionic Acid and other petrochemicals necessary to Forticel manufacture.

The New Forticel

What about the new Forticel? What is it like? What makes it the right plastic for appliance housings, automotive steering wheels, accessories, scale models, sunglass frames, fountain pens, etc.? In the first place, today's Forticel is an even better plastic than its predecessor. This is the result of continued research into the development of new plasticizers, and improvements in processing.

A cellulosic, Forticel has *natural* impact strength or toughness. This is combined with a fine balance of desirable properties including, form retention, low mold shrinkage, weatherability and surface hardness. The new Forticel is available in a full color range, and supplied in uniform pellet size. Sample quantities are available for evaluation. The New Product Bulletin, NP-16 is ready for distribution. This bulletin covers the complete Forticel story from chemical and physical properties to molding and fabricating.

Celanese Corporation of America, Plastics Division, Dept. 101-K, 290 Ferry Street, Newark 5, N. J. Canadian affiliate, Canadian Chemical Company, Limited, Montreal, Toronto and Vancouver.

Typical Physical Properties of Forticel

Flow temperature	(°C.) (A.S.T.M.)	D569-48	167—178
Specific gravity		D176-42T	1.18—1.21
Tensile properties:	Yield (p.s.i.)	D638-52T	3380—5020
	Break (p.s.i.)	D638-52T	3470—5240
	Elongation (%)	D638-52T	56—68
Flexural properties:	Flexural strength (p.s.i. at break)	D790-49T	8400—8500
	Flexural modulus (10^5 p.s.i.)	D790-49T	0.23—0.30
Rockwell Hardness:	(R scale)	D785-51	62—84
ized impact	(ft. lb./in. notch)	D256-43T	2.7—11.0
Heat distortion	(°C.)	D648-45T	59—70
Water absorption—	% Sol. lost	D570-42	0.00—0.08
	% Moisture gain	D570-42	1.5—1.8
	% Water absorption	D570-42	1.8—1.8

Celanese* PLASTICS

*Reg. U. S. Pat. Off.

WATLOW'S NEW

CARTRIDGE HEATING UNIT

...HOT NEWS in cartridge heating units

SAME HEAT in 1/5 the size!

- A NEW HIGH of 375 watts per sq. in. (500°F operating temp. with .005" fit in hole.)
- L-O-N-G-E-R cartridge life.
- LIGHTER WEIGHT and smaller size—for greater flexibility in installation and design application.

WRITE for Bulletin 355.

WATLOW ELECTRIC MFG. CO.
SINCE 1922—DESIGNERS AND MANUFACTURERS OF ELECTRIC HEATING UNITS
1364 FERGUSON AVE.
SAINT LOUIS 14, MO.

THERMOPLASTIC MATERIALS
FOR EVERY REQUIREMENT

QUICK SERVICE

DEPENDABLE QUALITY

POLYSTYRENE
Standard colors and colors to your specifications

CELLULOSE ACETATE
All flows and colors

UNIQUE SPECIAL EFFECTS

PEARL ESSENCE MOLDING POWDERS
provide a deep lustrous beauty—compatible with any method of fabrication. Available in polystyrene, cellulose acetate, acrylic and polyethylene pellets, clean, dust-free, easy to handle.

TINSELS PHOSPHORESCENTS METALLICS

WRITE OR PHONE FOR SAMPLES & PRICES

PLASTIC MATERIALS, Inc.
589 Main Street, Westbury, L. I., N. Y.
EDgewood 3-2666

illustrate some of the typical packaging problems involved and how they were solved through the adoption of molded polystyrene containers.

In their swing to rigid plastic packages, merchants are primarily interested in the impulse sales appeal created by such boxes and/or re-use value. They have also found, however, particularly in conjunction with transparent containers or those having transparent covers, that merchandise within them is not subject to as much pre-purchase handling as items in blind packages. Result: faster turnover of merchandise, less damage to stock, better profits.

Displayed, yet Protected

This point is well illustrated by the molded travel case used by Gillette for its popular safety razor. The pop-open case, with its red or blue base and domed transparent cover, permits close examination of the razor, yet protects it against becoming soiled and shopworn. In the various types of molded blade dispenser packs used by Gillette and other razor manufacturers, even a used blade compartment is provided, eliminating a masculine dilemma which has persisted since the birth of the safety razor.

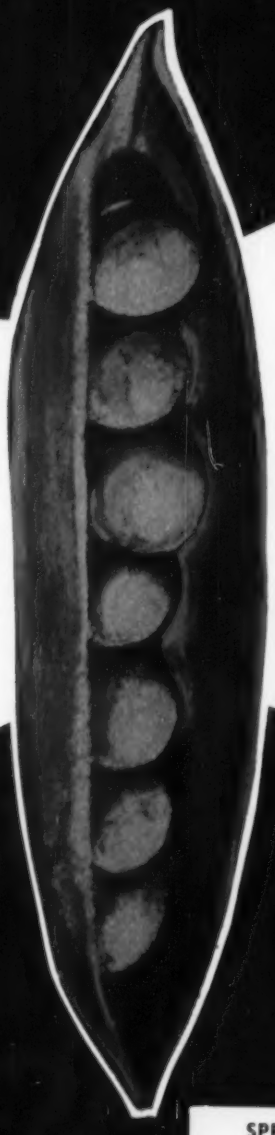
Sun glasses, wrist watches, pen and pencil sets, and various jewelry items are other typical personal products benefiting from the use of rigid polystyrene boxes. Dress zippers, coiled in a cylindrical transparent box with friction-fit cover, may be selected for color without removal from the package.

Clean, permanent storage for a Hughes hairbrush is provided by an unusually attractive molded polystyrene container incorporating a hinged transparent cover used in combination with a jet-black base. Among the many transparent molded tooth brush packages on the market are those used for the Squibb "angle" brush, making use of a friction-fit cover, and the unusual container, molded in two matching halves, in which the Dr. West's denture brush is sold.

The diminutive Winx mascara package, having a black polystyrene base and transparent hinged cover, holds a tube of mascara and an applicator brush and can be easily slipped into the purse for convenient carrying. Even more compact is the

colors for the plastics industry...

as uniform as two peas in a pod



CLAREMONT'S CALIBRATED COLORS

D SERIES — color pastes for vinyl banbury compounding

K SERIES — color pastes for plastisol compounding

V C — vinyl rotogravure inks for sheeting and film

V C — valley vinyl printing inks

D R SERIES — vinylized colors for extrusion

4000 SERIES — lightfast colors for polyester molding

All CLAREMONT PIGMENT CORP. products are guaranteed. You select your color just ONCE . . . it will never vary because of CLAREMONT'S calibration procedure.

Write today to find out how these new products can mean color uniformity from run to run for you.

SPECIAL OF THE MONTH

ROMAN PINK, A NEW TYPE OF DISPERSED ORGANIC RED FOR VINYL.

Tints are stable during processing for 60 minutes at 350 degrees F. and for 320 hours under ultra-violet exposure.

Claremont PIGMENT DISPERSION CORP.

413 Flushing Avenue, Brooklyn 11, N. Y.

DIEMOLDING SPECIALIZATION BENEFITS *You!*

If you have a thermosetting plastics problem, we'd like a chance to solve it for you. Our complete, modern plant is set up exclusively for compression, transfer and plunger type molding, and our experience dates back to 1920.

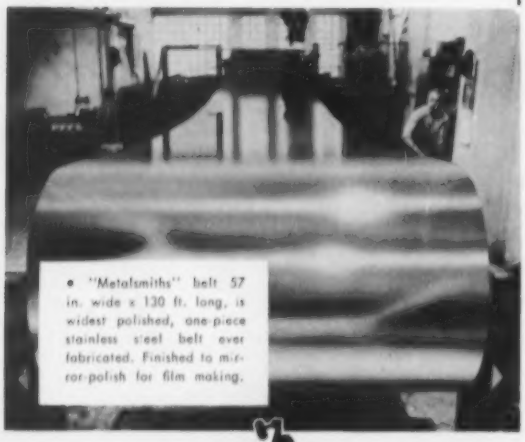
An ideal Central New York location permits overnight deliveries to all major industrial centers of the East. Our technical "know-how" and equipment are at your service. . . . Write today for the Diemolding story.

Specialists in molded cooking utensil components and electrical insulation parts.

DIEMOLDING CORPORATION
CANASTOTA, NEW YORK

Increase Production

of sheets — film — coatings and laminated work!



• "Metalsmiths" belt 57 in. wide x 130 ft. long, is widest polished, one-piece stainless steel belt ever fabricated. Finished to mirror-polish for film making.

Endless Stainless Steel Belt speeds up and improves cooling, setting and conditioning.

•

One piece—polished or unpolished
Widths to 60 inches
—length unlimited
—no center seam

Investigate the many cost-cutting and production advantages of endless belt-processing of plastics, film, foam rubber, latex, resins, leather, compounds, coatings and laminated work.

"Metalsmiths" 18-8 Stainless Steel Endless Belts furnish a dense, corrosion-free, highly polished surface that imparts an automatic contact-gloss. All welds finished to same thickness and polish as the belt. Camber and width are accurately controlled.

Consult our engineering department on possibilities for your products, without obligation.

METALSMITHS, Div. of Orange Roller Bearing Co., Inc.
558 White St., Orange, N. J.

METALSMITHS
STAINLESS STEEL
ENDLESS CONVEYOR BELTS

molded package used by Ronson for its handy Liter Kit, containing five flints, a wick and inserter, and a striker-wheel brush. With its compartmented blue base and hinged transparent top, this package measures only 1⅜ by 2 in., and is only ¼ in. thick.

Several cigar manufacturers are now selling assortments of quality cigars packed in molded polystyrene humidor-type containers which provide added sales appeal and are used by the purchaser to keep cigars fresh. They are only a fraction of the weight of similar glass humidor packs.

Plastic Foam Insert

Steadily increasing is the use of molded packages for pharmaceuticals. One of the most interesting and unusual is that adopted by Chicago Pharmacal Co. for its "Gems of Vitality" Renuvo B-complex vitamin capsules. Inserted in a hinge-style transparent stock container is a grooved block of Styrofoam in which the tablets are nested and overwrapped with Saran film. A decalcomania on the cover provides manufacturer identity.

Molded polystyrene containers are also used by Ethicon Suture Laboratories, Inc., for surgical sutures and by The Upjohn Co. for its new line of Neo-Cortef Escaps eye ointments, which are single-application gelatin capsules sterilized by a new irradiation process. The Ethicon container permits immediate identification of the sutures without removing them from the package. Within the Upjohn hinge-style box, the capsules are sealed in cellophane strips. For retailing the ointment in tubes, a similar stock box is used in combination with a vacuum formed Royalite base insert having a cavity in which the tube fits.

Custom Designed

By way of contrast, two other molded polystyrene containers demonstrate the application of custom design and molding to achieve a specific result. For its new Curad plastic adhesive tape, Bauer & Black has adopted a unique rectangular dispenser-type container molded of transparent polystyrene. Molded teeth on the hinged flap at the top of the package neatly cut off the tape to any desired length when the top is pressed firmly down. The tape is

mounted on a sturdy, rigid core specially designed for the new dispenser. Two colorful lithographed inserts show through the container, identifying the product and listing sales features. The dispenser won't roll away, keeps the tape cleaner than old-type dispensers, and plainly shows the amount of tape left in the package at all times.

Also specially designed and custom molded is the new Steri-Vial case adopted by Parke, Davis & Co. for distribution to internes and resident physicians. In a compact eggshell-white styrene case measuring only 4 by 6½ in. in size, this unit provides the doctor with seven drugs frequently needed on house calls. An interesting construction feature is a hinged inner tray which swings up to permit easy removal of the five bottles within the case. Company identification is by means of raised gold lettering on the hinged cover.

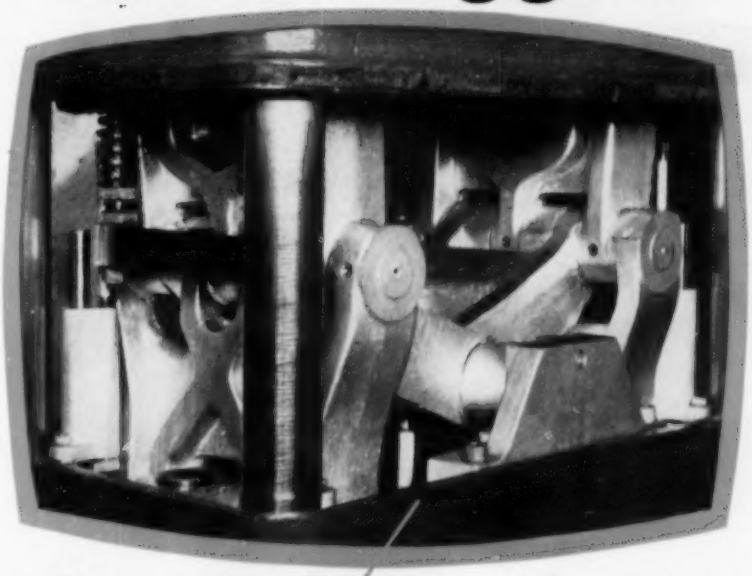
Hardware on Display

Many items handled by hardware stores, which in former years were kept out of sight in drab blind packages, are now going out on self-service counters in attractive molded polystyrene packages which show off the merchandise to advantage and have lasting value for storage of the original product or miscellaneous reuse assignments.

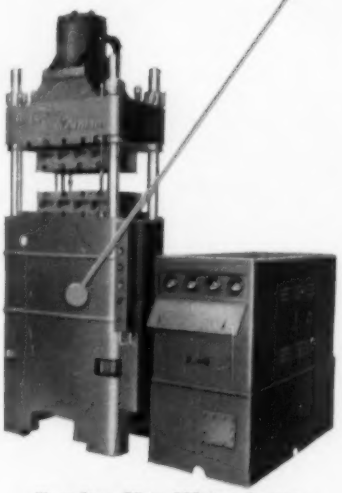
Such containers range from simple stock boxes such as those used for nuts and bolts, washers, sharpening hones, etc., to specially designed containers for sets of steak knives, carving sets, drill sets, and other products. For example, a two-part molded package used by Sears, Roebuck & Co. for its Craftsman line of power wood bits combines a bright red opaque base section with a transparent cover. Product identification and special lug supports are molded-in as an integral part of the cover, eliminating a number of hand assembly and finishing steps. The base portion also has molded-in, raised lugs shaped to fit the various sized tool bits. Numbers identifying the bit sizes are also molded in bas-relief on the plane surface of the lower section, to assist the user in proper tool selection.

By specifying a hinge-style transparent polystyrene molded container for its versatile new Travelok, which may be conveniently carried and applied without permanent fastening

these toggles



Cut Molding Costs



Sizes from 20 to 300 tons in compression, transfer and combination types. Semi-automatic and Completely Automatic Models. New high-speed operation. Write for brochure.

The exclusive toggle design of Hull-Standard Molding Presses places them in a class by themselves, and offers you cost-wise advantages that no other molding press can offer.

Lower Investment
Hull-Standard Presses cost about ⅓ less than conventional straight-ram type Presses because they operate on low hydraulic pressures—multiplied up to *7 times* by the toggle action to the high molding pressures required. This mechanical advantage of the toggle offers the same production capacity for ⅓ less outlay.

Lower Operating Cost
Current cost is pennies per day because the small motor needed to drive the low-pressure hydraulic power supply is less than half the size required for straight-ram type presses.

Lower Maintenance Cost
No high-pressure hydraulic problems, no blown packings and piping leaks, no down time for repairs.

More productive time on the job.

These are the reasons why Hull-Standard Molding Presses have been the—

Money-Making Workhorses
of the Plastics Industry for more than 20 years. Ask the men who own them.

HULL-STANDARD
ABINGTON, PENNA.
CORPORATION
20 YEARS OF SERVICE TO THE PLASTICS INDUSTRY

They'll come out EASIER CLEANER FASTER if you use METASAP® STEARATES

***M**olders who know* use Metasap Zinc or Calcium Stearates... they find them the surest, safest way to eliminate disintegration and breakage of finished products.

Further, you can add these Stearates in two ways. You can incorporate them into the molding compound ...or simply dust them onto the mold surface. Either way, you'll find this improved lubrication *minimizes ejection pressures.* You'll increase your output, get fewer rejects, better products. Your molds last longer, too.

So specify compounds containing Metasap Stearates, or incorporate them directly into your own molding compound. Metasap Technical Service is prepared to help you find the materials and mixing procedures best fitted to your production methods.

EXCELLENT THICKENERS FOR PLASTISOLS

Metasap also offers a complete line of quality Stearates, effective as thickening agents. We'll be glad to make available to you free testing samples of Magnesium, Barium, Calcium, or Aluminum Stearates. Ask for yours today.

METASAP CHEMICAL COMPANY

METASAP CHEMICAL COMPANY
HARRISON, NEW JERSEY

Chicago, Ill. • Boston, Mass.
Cedartown, Ga. • Richmond, Calif.

a NOPCO subsidiary

the cleanest stearates made

to chests, closet doors, etc., Yale & Towne Mfg. Co. was able to lift the product out of the everyday category and create added sales appeal as a gift item. Thanks largely to the adoption of this container, believed to be the first such package ever used for a lock, the product can be effectively merchandised in gift shops, novelty stores, rail and bus terminals, etc., as well as through conventional hardware outlets. Within the showcase style package, the lock and keys nest in a die-cut paperboard base.

For Heavy-Duty Use

Any idea that molded polystyrene packages must be confined to light-duty jobs is dispelled by a carrying case adopted by Admiral Corp. for its new 36-piece complete power drill kit. This rugged container, consisting of a red polystyrene base and a hinged transparent cover to which a molded polystyrene handle is attached, measures 6 by 12 by 4¼ in. in height. The complete outfit, including the case itself, the ¼-in. power drill, and the various accessories, weighs 8½ pounds. According to Admiral, no instances of breakage have been reported and the unusual display appeal of the case has been an important factor in building sales.

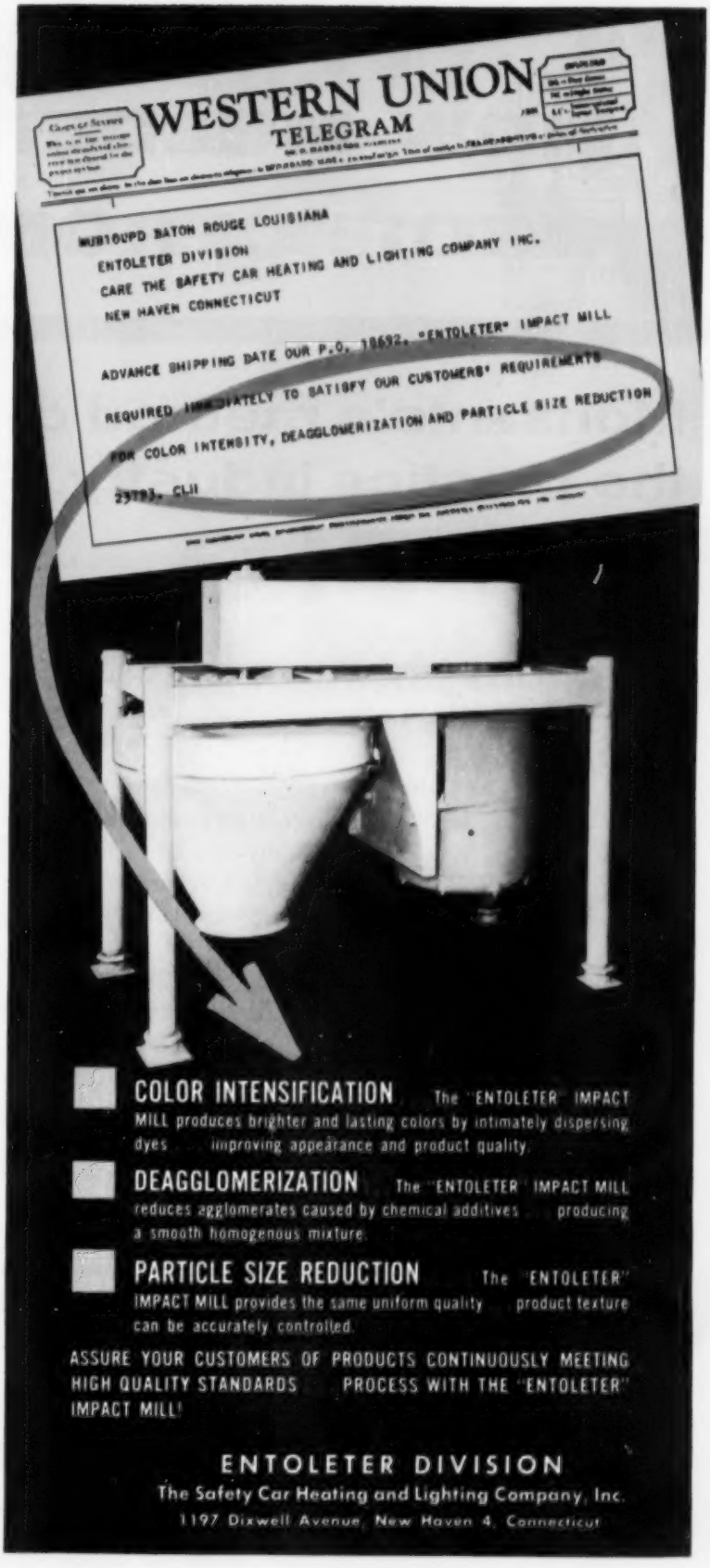
A sturdy paperboard platform is placed in the bottom section of the carrying case to secure the drill against movement. The metal hinges and toggle-type latch are secured to the base and cover by means of rivets. Metal anchors for the handle are also fastened to the lid by metal rivets. Wall sections of the case measure approximately 3/32 in. for adequate strength. The case is so designed that the cover, when closed, overlaps the beaded, reinforced edge of the colored base.

Sporting Goods

Largely because of their obvious re-use value for the fisherman, plus the fact that they add an extra sales sparkle to colorful lures, spools of fishing line, and related products, molded polystyrene containers have been widely adopted for many types of fishing tackle. From the re-use standpoint, the plastic boxes are ideal because they provide visibility for quick selection, protect lures against physical damage, and are immune to rust and moisture.

Although stock molded boxes,

(*To page* 240)


WESTERN UNION
TELEGRAM
WUB10UPD BATON ROUGE LOUISIANA
ENTOLETER DIVISION
CARE THE SAFETY CAR HEATING AND LIGHTING COMPANY INC.
NEW HAVEN CONNECTICUT
ADVANCE SHIPPING DATE OUR P.O. 18692, "ENTOLETER" IMPACT MILL
REQUIRED IMMEDIATELY TO SATISFY OUR CUSTOMERS' REQUIREMENTS
FOR COLOR INTENSITY, DEAGGLOMERIZATION AND PARTICLE SIZE REDUCTION
29783. CLII
COLOR INTENSIFICATION The "ENTOLETER" IMPACT MILL produces brighter and lasting colors by intimately dispersing dyes improving appearance and product quality.
DEAGGLOMERIZATION The "ENTOLETER" IMPACT MILL reduces agglomerates caused by chemical additives producing a smooth homogenous mixture.
PARTICLE SIZE REDUCTION The "ENTOLETER" IMPACT MILL provides the same uniform quality product texture can be accurately controlled.
ASSURE YOUR CUSTOMERS OF PRODUCTS CONTINUOUSLY MEETING HIGH QUALITY STANDARDS PROCESS WITH THE "ENTOLETER" IMPACT MILL!
ENTOLETER DIVISION
The Safety Car Heating and Lighting Company, Inc.
1197 Dixwell Avenue, New Haven 4, Connecticut

HOW MOLDERS USING PROFIT FROM LATEST

Monsanto's method of serving the plastics industry . . .

QUALITY MATERIALS

First and foremost, Monsanto serves the plastics industry by making the finest plastic materials possible. Monsanto research and product development bring you products like . . .

Orizon **polyethylene**—This newest of the Monsanto family of plastics is manufactured by an entirely new process developed by Monsanto research and unique in the industry. Due to this special manufacturing process, Orizon polyethylene has unusual properties that show promise of broadening the potential applications for polyethylene.

Another advantage of this process is that it assures greater uniformity of the chemical and physical properties of the material. This uniformity, combined with large-unit blend size, means higher operating efficiency and lower costs for the user.

Orizon is currently being supplied in formulations for molding, film, pipe, wire coating, extrusion-lamination coatings and blow molding. Orizon is supplied in the form of small, square pellets.

Lustrex **styrene**—The diversified range of Lustrex formulations available provides molders wide latitude in selecting the type of Lustrex styrene molding compounds with specific properties desired for particular applications and molding conditions. Lustrex formulations include:

Lustrex L—general purpose material for standard molding requirements.
Lustrex Hi-Flow 55—properties similar to general purpose material with fast flow especially suitable for molding thin walls at high speed on automatic equipment.
Lustrex Hi-Test 88—Rubber-modified, high-impact styrene with fast flow and good gloss widely used for large industrial parts.
Lustrex LHA—modified medium impact material with high gloss.
Lustrex Hi-Heat 99—for applications requiring heat resistance up to 204° F.
Lustrex LXC—super high-heat resistant material. Withstands boiling.

Orizon* AND Lustrex*

MONSANTO PROMOTION

New "Trip to Disneyland" Contest is typical of many Monsanto-inspired promotions for housewares, toys, wall tile, packaging and custom molded parts. The sticker and official entry blanks pictured on this page are being furnished free to companies molding toys of Orizon and Lustrex.

MERCHANDISING

15,000,000 toys will be packaged with contest stickers and entry blanks this Christmas!

Five first prizes offering free trips to Disneyland—and 1,010 additional awards—will provide a powerful extra incentive for families coast to coast to buy toys molded of Monsanto's Orizon polyethylene and Lustrex styrene.

Advertising in Dell Comic Books and over the CBS-TV network are part of Monsanto's plan for making this the biggest year in history for plastic toys.

*ORIZON AND LUSTREX. REG. U. S. PAT. OFF.

WIN A FREE TRIP TO Disneyland
FOR YOUR FAMILY
CONTEST ENTRY BLANK INSIDE
Girls! Moms! Dads!
Disneyland
IN MONSANTO'S EASY JINGLE CONTEST!
It's fun! Just write a fourth line for the jingle on Official Entry Blank. Use other side.
5
FIRST PRIZES
CONTEST SPONSORED BY MONSANTO
10 SECOND PRIZES
17" PHILCO TELEVISION SETS
50 THIRD PRIZES
BELL & HOWELL MOVIE CAMERAS
250 FOURTH PRIZES
WESTINGHOUSE PORTABLE RADIOS
750 FIFTH PRIZES
BROWNIE "HOLIDAY" FLASH CAMERAS BY KODAK
HOW TO WIN! SEE OTHER SIDE!

Toys that have this official contest entry blank, provided by Monsanto, are identified by a box sticker. It's a promotion that packs excitement—and sales action—at the retail counter.

MONSANTO

Monsanto Chemical Company
Plastics Division
Springfield 2, Mass.

HARSHAW

cadmium lithopone

YELLOWS and REDS

Available in Eleven Brilliant Shades

- YELLOW
- ORANGE
- RED
- MAROON

For colorful plastics in rich deep tones or delicate pastel tints, use Harshaw cadmium pigments. Their maximum chemical and heat resistance combined with complete insolubility make them excellent colorants for many types of plastics, such as: polystyrene, polyvinyl chloride, cellulose acetate, polyethylene, and methyl methacrylate.

it's yours

Send for color folder showing complete line of Harshaw Cadmium Lithopone Yellows and Reds.

Corresponding shades of concentrated C. P. Cadmium Pigments are also available.

THE HARSHAW CHEMICAL CO.

1945 EAST 97th ST., CLEVELAND 6, OHIO

clip and mail

Send me your Cadmium Lithopone Color Card.

My Name_____

Company Name_____

Street_____

City_____ Zone____ State_____

tubes, etc., satisfactorily fill the packaging bill for many fishing tackle items, a number of manufacturers have developed specially designed molded containers having unique features. For example, the new "Twist-Free Pak" used by South Bend Bait Co. for its Deceiver monofilament nylon spinning line consists of a square, slip-cover transparent box having a small opening centered in the lid. The special feature of this package is that it enables the sportsman to transfer the line from package to spinning reel by feeding the line out through the opening in the cover, securing it to the reel spool, and allowing the line to unwind directly from the supply spool without twisting.

Other Uses

In the miscellaneous category, molded polystyrene packages are racking up increased sales and doing an excellent job of protection for scores of products. Even tiny charms and trinkets sold through coin operated vending machines have made their appearance in diminutive clear transparent molded "bubbles," made in two mating halves, which glamorize the item and give the sales unit a definite shape and size for handling by the dispensing mechanism.

Speed Products Co., Inc., Long Island City, N. Y., has made highly effective use of molded polystyrene containers for such products as its "Tot 50" desk stapler and extra supplies of staples. Distinctive "family" resemblance for these packages is achieved through use of a bright blue base section in combination with a clear transparent lid; hinges and catches are integrally molded. Identifying data are molded in relief on the underside of the cover, leaving the exterior surface perfectly smooth but giving the letters unusual legibility because of the way they reflect light. The compartmented base of the stapler package separates the stapler itself from the extra supply of staples, while the hinged cover is designed with a deep longitudinal rib on the underside which bears against the staples and holds them in position.

Perhaps one of the most ingenious molded polystyrene containers yet to appear on the market is the Tidee Maid self-dispensing thread box produced by Flambeau Plastics

Companies

you can trust

...trust Norton

The cabinet shown here is a hydrocolloid conditioner. Hydrocolloid compounds, used by dentists in making impressions for dental restorations, are liquefied, stored, then tempered in the three electrically heated compartments. Naturally, as health care equipment, the cabinet must deliver its heat dependably with absolute precision.

The manufacturer, Hanau Engineering Company of Buffalo, N. Y., chose to have the plastic components made by Norton.

Hanau's confidence in Norton workmanship is well placed. We have been producing custom molding to the same sort of demanding "specs" for better than 25 years, and doing it for many of the country's top companies. This same top-notch engineering skill can be applied to your next molding job. And in selecting Norton, you're assured of prompt deliveries and low, sensible prices.

Norton Laboratories, Inc., Lockport, New York
Sales Offices: New York—175 Fifth Avenue;
(Chicago) Elmhurst—193 Orchard Street; Cleveland—20605 Kings Highway;
Detroit—3-167 General Motors Building; Philadelphia—4719 Longshore Street;
Rochester—739 Powers Building.

NORTON *Laboratories, Inc.*

COMPRESSION AND INJECTION MOLDING

Corp., Baraboo, Wis. This container, molded of clear polystyrene, consists of a base and a lift-off type cover. The lower portion is molded with 14 integral vertical spindles on which spools of thread may be placed. Slots in the top edge of the base permit thread from each spool to be fed out from the various spools. Directly in line with these slots, and molded into the cover as inserts, are 14 razor-like cutting edges by means of which threads may be conveniently cut to any desired length. Spools of thread within the box may be seen directly through the container for color selection and need not be removed from the box until empty.

Industrial Parts

Many manufacturers have found molded polystyrene containers the ideal solution to orderly shipping and stocking of small industrial products or parts which might otherwise become damaged or prove difficult to handle in subsequent manufacturing operations. For its phonograph cartridges—delicate electronic components measuring only 2¼ in. long—Electro-Voice, Inc., adopted a specially designed two-piece molded container which fits all types of replacement cartridges. The cover is transparent and the bases are molded in various opaque colors; parts numbers are hot-stamped on the base for code identification and inventory control.

By combining a stock type of hinged polystyrene box, having a friction-type lug closure, with specially molded protective inserts for individual protection of delicate electrical components, Instrument Corp. of America came up with a container which not only provides product visibility but also does a highly effective job of protection. Previously, for packaging its miniature slip-rings for shipment to other manufacturers, this company used the same type of stock transparent container in combination with a grooved paperboard insert. The difficulty with this arrangement lay in the fact that when the box was opened, the individual rings were exposed to harmful dust and handling.

This problem was overcome by developing a molded polystyrene insert, consisting essentially of a base plate with vertical grooves into which fit the protective capsules enclosing each slip-ring assembly. The capsules themselves, molded in two halves, are held tightly closed around the rings by means of U-shaped clips or keys. Ten units are placed in each plastic box, thereby insuring individual protection for each slip-ring assembly until it is withdrawn from its disposable capsule.

Values Unlimited

While the examples described above can hardly convey the full impact of molded polystyrene containers in the packaging field, they provide some idea of the broad range of products for which such packages are now being used. In view of the hundreds of stock molded containers now readily available, plus the willingness and ability of molders to cooperate in developing custom containers, almost any producer of a packaged product—large or small, wet or dry, hard or soft—can find added sales features, re-use possibilities, and many other "plus" values in rigid molded polystyrene packaging.—End

because COLOR IS A FACTOR

Temperature is vitally important in plastic molding. Proper molding temperature assures not only true colors, but accuracy of form and maximum strength as well. The Cambridge Mold Pyrometer offers a quick, simple and accurate means of checking mold cavities temperatures. It is a rugged instrument built for plant use . . . so easy to use that molders will use it.

Combination and Single Purpose Instruments

Send for bulletin 194—S

CAMBRIDGE INSTRUMENT CO., INC.
3711 Grand Central Terminal N.Y. 7, N.Y.

CAMBRIDGE
MOLD • NEEDLE • ROLL
PYROMETERS

Bulletin 194—S gives details of these instruments. They help save money and make better plastics.

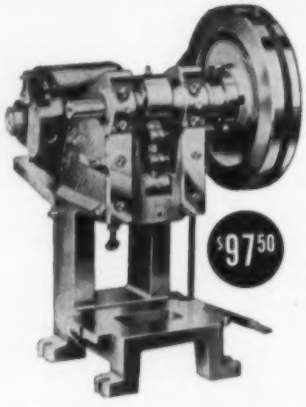
CUT COSTS

with

ALLEN *Punch Press*

2-Ton Power Bench Type.

less Motor



- Powerful
- Dependable
- Economical

FREE CIRCULAR

Fully Guaranteed.

Order TODAY. Price $97.50 F.O.B., Clinton, Mo. (Includes Motor bracket, V-belt, motor pulley, less motor).

Dealer Inquiry Invited

For light work—stamping, forming, riveting, etc.—metal, fiber or other material. Overall height 20¼" . . . Base size 9"x8¼" . . . Die bed 6¼"x8" . . . Ram face 1½"x 3½" . . . Ram stroke ¾" . . . positive ⅝" ram adjustment . . . sturdy, single pin, non-repeat hand lever clutch . . . V-belt drive . . . weight 105 lbs.
Requires only 1/3 H.P. motor.

The machine of a thousand uses! Adequate for many types of work now done on large presses at greater expense.

ALVA F. ALLEN, *Dept. MP*, CLINTON, MO.

This one SPEED NUT for either screw provides new savings!

If you use "A" and "Z" sheet metal screws in your product assemblies, here's good news for everyone from your design and production engineers to stock room clerks.

C7000 Flat Type SPEED NUTS work equally well on both "A" and "Z" sheet metal screws—only one type of SPEED NUT brand fastener to purchase, stock and handle. You reduce inventories, eliminate parts mixing. And you can also lower unit costs through larger quantity purchases.

One SPEED NUT replaces three parts . . . lock washer, threaded nut and spanner washer. Yet it offers an attachment that is permanently tight until you want to loosen it!

Ask your Tinnerman representative for samples of the new dual-service C7000 Flat Type SPEED NUT . . . it's the modern way to save time and money, and avoid headaches!

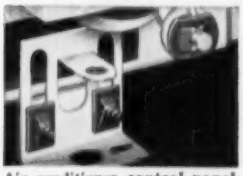
TINNERMAN PRODUCTS, INC. • BOX 6688, DEPT. 12, CLEVELAND 1, OHIO

Canada: Dominion Fasteners, Limited, Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Limited, Treforest, Wales. *France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse, Levallois (Seine). *Germany:* Hans Sickinger GmbH "MECANO", Lemgo-i-Lippe.

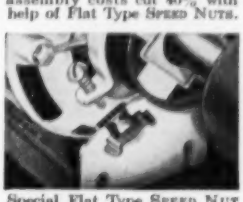
TINNERMAN **Speed Nuts**®
FASTEST THING IN FASTENINGS®

TYPICAL USES

Flat Type SPEED NUTS cut costs of attaching auto radio speaker to baffle.



Air-conditioner control-panel assembly costs cut 40% with help of Flat Type SPEED NUTS.



Special Flat Type SPEED NUT reduced assembly time 87% on washer motor mount bracket.

...because they went to their doctors in time

Many thousands of Americans are being cured of cancer every year. More and more people are going to their doctors *in time*. That is encouraging!

But the tragic fact, our doctors tell us, is that every third cancer death is a needless death... *twice* as many could be saved.

A great many cancers can be cured, but only if properly treated before they have begun to spread or "colonize" in other parts of the body.

YOUR BEST CANCER INSURANCE is (1) to see your doctor *every year* for a thorough checkup, no matter how *well* you may feel (2) to see your doctor *immediately* at the first sign of any one of the 7 danger signals that may mean cancer.

For a list of those life-saving warning signals and other facts of *life* about cancer, call the American Cancer Society office nearest you or simply write to "Cancer" in care of your local Post Office.

American Cancer Society

I WAS PUTTING OUT PLENTY FOR PLASTICIZERS

until I learned—

Sovaloid C
can cut plasticizer bills
30-90%

For Full details call your nearest Representative

Process Products

SOCONY MOBIL OIL COMPANY, INC.
26 Broadway, New York 4, N. Y., and Affiliates:
MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.
Formerly Socony-Vacuum Oil Company, Inc.

Urea Housing

(*From page* 100)

is shielded against accidental handling or damage by a raised rim in the molded back, having openings where fingers may be inserted in order to rotate the dial.

Palm-sized for comfortable carrying and use, the Skan Quick meter is designed with the light aperture at the end so it can be pointed directly at the subject for accurate readings. The tipped down mounting of the cell eliminates sky light automatically from outdoor readings. The front side of the case includes horizontal ribs which provide a secure hand grip and a slot at the right side through which the metal plates carrying the ASA index numbers are slid into place in the meter to obtain instant readings for different types of film. All molding and assembly of the housing itself are handled by G-M Laboratories in its own plant.

The light window is made without side cores in the mold, since each section of the case includes half of the aperture, producing the full opening when the halves are joined. The glass crystal over the indicator needle is locked in position within the housing by means of a special type of rectangular phosphor-bronze spring which holds the glass firmly, yet guards against possible breakage by permitting differential expansion and contraction of the glass and plastic due to temperature variations.

Carrying Case

The polyethylene carrying case, molded in one piece, is produced in a simple type die without side cores or undercuts. The front flap, which snaps in closed position to protect the front of the meter, is molded at 90° to the back. There are no secondary operations required on the case after molding. The holes for the neck cord, cover latch, form, and surface texture of the case are obtained by one-shot molding.

CREDITS: Parts for meter housing molded of Plaskon urea on Stokes automatic compression presses. Polyethylene carrying case, Mills Plastic Div., Continental Can Co., 2930 N. Ashland Ave., Chicago. Styrene display case, Continental Plastics Corp., 2934 W. Lake St., Chicago, Ill. Design of meter and carrying case, Palma-Knapp Assoc., 600 W. Jackson Blvd., Chicago.

for BRILLIANT
COLOR
ON METALLIZED
PLASTICS

NEARLY
ALL METALLIZERS
Use
REZ
•n•
DYE

But now there's even more! Now Schwartz Chemical Co. can supply you with the base coat (#107) and the top coat (#101) for the metallizing of polystyrene as well. All 3 processes from one source! The same high standards that have made Rez-N-Dye the *accepted* product in its field since 1938 is your assurance of quality and performance in the base and top coat, too.
Permanent, easy handling, light fast and uniform, Rez-N-Dye is applied in seconds. Comes in gold and many other shades. Send for free samples and prices of all products.

FULFILLING THE NEEDS OF THE PLASTIC INDUSTRY

For descriptive literature write

Schwartz
CHEMICAL CO., INC.

328 W. 70th St., New York 23, N. Y.

The Finishing Touch *

Engineered and Produced by
Detroit MACOID

* MACOID produces a variety of anti-squeak trim moldings for automobile interiors which were designed and engineered in cooperation with leading automobile manufacturers.

Producing intricate injection molded trim for automobile interiors is only one of MACOID'S many specialties.

Whatever the product – if it can be made of thermoplastics there's a team of MACOID specialists ready to step in and do the job quickly, efficiently at *any* stage of development!

If you'd like, MACOID stylists can translate your rough sketch into a practical, finished design. Or MACOID'S engineering staff can convert your product specifications into working drawings.

And – MACOID is equipped to maintain *quality standards* at the lowest possible per-unit cost. MACOID'S extrusion and injection molding facilities are among the most efficient in the industry.

For a way to do it better with plastics – consult Detroit MACOID.

DETROIT MACOID CORPORATION

12340 CLOVERDALE, DETROIT 4, MICHIGAN

EXTRUSION AND INJECTION MOLDING

Originators of Dry Process Plastics Extrusion

Furniture

(*From pp.* 104-105)

chamber. Rovings of fibrous glass are chopped into short sections which are deposited on the shaped mandrel. A binder spray causes the glass filaments to cling together as they build up on the form. This technique provides uniform feed of the fibers and close control over the quantity of material used. Upon removal from the chamber, the preform is "baked" briefly in an oven to set the binder and give the preform adequate strength for handling. The preform is then placed in the die and a measured quantity of polyester resin is poured over the part before the mold is closed.

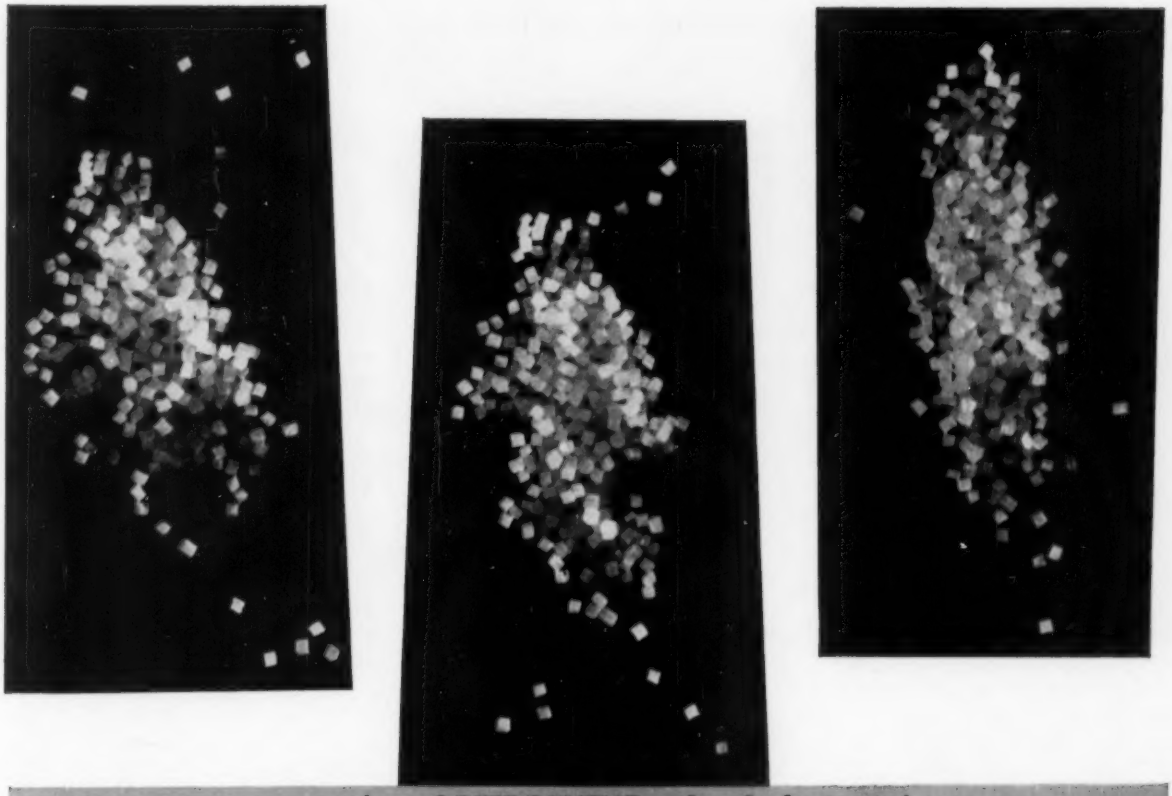
Assembly

Although complete information is not available at this time on the final fabrication of the new Valentine Seaver chair and sofa, the principal steps involved are as follows:

In assembling the chair, the basic shell is covered with vinyl sheeting on the back and the foam rubber padding is secured to the inner surfaces. Legs are then mounted on the shell and the upholstery, which matches the pattern of the removable foam rubber seat cushion, is slipped into place.

For the sofa, the four reinforced plastic components—back, end bells, and front rail—are covered with heavy gage sheet vinyl material in the desired color and surface effect. The covering, adhered directly to the reinforced plastic components by means of selected adhesives, is thus permanently bonded to the molded parts, providing a finish of lasting beauty which resists scuffing and staining, may be easily kept clean by occasional wiping with a damp cloth, and will keep its fresh, new appearance for years. After covering, the parts are assembled into a single unit with bolts and other mechanical fasteners.

Further company research on the project will probably encompass, among other things, studies of various types of finishes which may be successfully applied to the basic reinforced plastic shells and the possible incorporation of structural components to replace framing and other parts customarily fabricated of wood.—END



properties of PETROTHENE polyethylene resins

Natural Color *(Average Values Unless Otherwise Shown)*

Property	ASTM Test Method	PETROTHENE 100	110*	200	201	202	203	210*
Melt Index	D-1238-52T	2.2	2.2	3.0	5.0	2.2	8.0	3.0
Bulk Factor	D-1182-51T	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Brittleness Temp., °C.	D- 746-52T	<—70	<—70	<—70	<—70	—	—	<—70
Specific Gravity	—	0.92	0.92	0.92	0.92	—	—	0.92
Tensile Strength	D- 412-51T							
Yield Point, psi		1320	1320	1320	1250	1200	1250	1320
At Fracture, psi		1800	1800	1750	1650	1250	1500	1750
Elongation, %	D- 412-51T	540	540	540	520	480	490	540
Tear Resistance lbs. per inch Thickness	D-1004-49T	540	540	535	—	—	—	535

*Exhibits superior slip properties, for packaging film.

now 3 series of PETROTHENE® polyethylene resins

PETROTHENE 100 Series — high-quality resins for those applications demanding outstanding properties. Especially recommended for extrusion into film and blow molding.

PETROTHENE 200 Series — general purpose resin for extrusion, injection, compression molding and paper coating. Types 201, 202 and 203 higher flow materials designed for large molded parts and increased production rates.

PETROTHENE 300 Series — resins especially adapted for wire covering and electrical insulation specifications.

Write for samples and descriptive brochure to:

U.S.I. INDUSTRIAL CHEMICALS CO.

Division of National Distillers Products Corporation
99 Park Avenue, New York 16, N. Y.

POLYETHYLENE PLANT AND LABORATORY FACILITIES AT TUSCOLA, ILLINOIS • WAREHOUSE POINTS AT ANAHEIM, CALIFORNIA; CHICAGO, ILLINOIS; CINCINNATI, OHIO; JERSEY CITY, NEW JERSEY; NEW ORLEANS, LOUISIANA

Vinyl Dispersions

(*From pp. 106-109*)

sion-resistance of conventional baked-on texture finishes.

Artwire Creations, Inc., Suffern, N. Y., manufacturers of wire and metal specialties, have installed their own coating department for applying plastisols to kitchen wire goods, such as dish drain holders. According to Artwire, the latex rubber coatings previously used deteriorated and would become sticky and gummy after being exposed to fats and greases—a disadvantage which the use of the vinyl coatings completely eliminates. In addition, the resiliency of the coating is equal to that of rubber in protecting fine dishware. The plastisol can also be colored more easily and with more permanent pigments than were possible with rubber.

Michigan Chrome and Chemical Co., Detroit, Mich., reports among its case studies on one manufacturer who took advantage of the corrosion resistance of the plastisols to coat a large exhaust system manifold; on another who scrapped the wooden boxes he formerly used for transporting jet blades in favor of coated wire baskets and trays which proved to have a considerably longer service life; and on still a third who found an ideal application for plastisols in coating hangers for conveyor and assembly fixtures. In the latter application, before the introduction of the plastisols, the hangers had to be fabricated of round stock in order to permit the round rubber hose previously used as protection to be slipped easily into place over the hangers. By switching to plastisols applied by dipping, the manufacturer can utilize chanel, rectangular, square, or odd-shape sizes.

United Chromium offers the following case histories:

A large automobile manufacturer experienced excessive maintenance costs on rubber-coated degreasing baskets and switched to plastisols. Now he reports no damage whatever to coating after three years of heavy production work.

The plating division of another large automobile manufacturer reports that, after being subjected to the roughest kind of punishment for 9 mos., plastisol-lined tumbling barrels have proved more durable than those lined with an equal thickness of synthetic rubber—yet, because of the ease with which they can be sprayed-applied and baked to form a tough, continuous film, are less costly.

And, to illustrate just how far afield the plastisols are going, a leading brain surgeon is using the material on his surgical instruments as a resilient coating that can withstand the steam and chemicals used in sterilizing.

From other companies have come similar reports of industrial and consumer success.

Decorative Finish

Much of the current enthusiasm focused on the dispersion coatings has centered on the possibilities inherent in the novel decorative surface effects that can be achieved.

John L. Armitage & Co. has made an important step forward in this direction with the development of a spray-on organosol formulation (to which a texturing agent is added)

Ferro Quality Checks assure
BINDER CONTENT
uniformity...foot by foot

From *every roll* of Ferro *Uniformat*® three 5″ by 5″ samples are cut and carefully weighed. The samples are then placed in a furnace where organic material is burned off and the residue weighed to determine the percentage of binder. Binder content is maintained within ± ½ of 1% of your specifications.

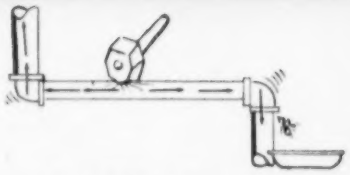
This is just one of 6 Ferro Quality Checks that assure roll-by-roll uniformity of *Uniformat* Reinforcements. This is just one of the reasons you should try *Uniformat*. May we tell you more?

FERRO "UNIFORMAT" *Fiber Glass Reinforcements*

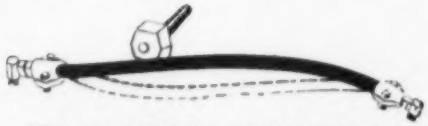
FERRO CORPORATION • (FIBER GLASS DIVISION) • NASHVILLE 11, TENN.

INJECTION MOLDERS
ELIMINATE COSTLY PRESS BREAKDOWNS

Replace leaking, vibrating, bursting steel pipe and rigid tubing.
Assemble flexible high pressure hydraulic lines on the job, in seconds, no special tools required.
Save pumps, valves, controls from damaging effects of constant shock and vibration.



SHOCK AND VIBRATION FRACTURES STEEL PIPE AND TUBING—LOOSENS THREADED CONNECTIONS—AND MAY DAMAGE HYDRAULIC CONTROLS.



ELGOOD HIGH PRESSURE HOSE ASSEMBLIES ACT AS SHOCK ABSORBERS—ASSEMBLIES DO NOT BREAK WHEN SUBJECT TO SHOCK AND VIBRATION- GROUND JOINT-DRY SEAL FITTINGS STAY TIGHT IN PLACE—ELIMINATES LEAKS.

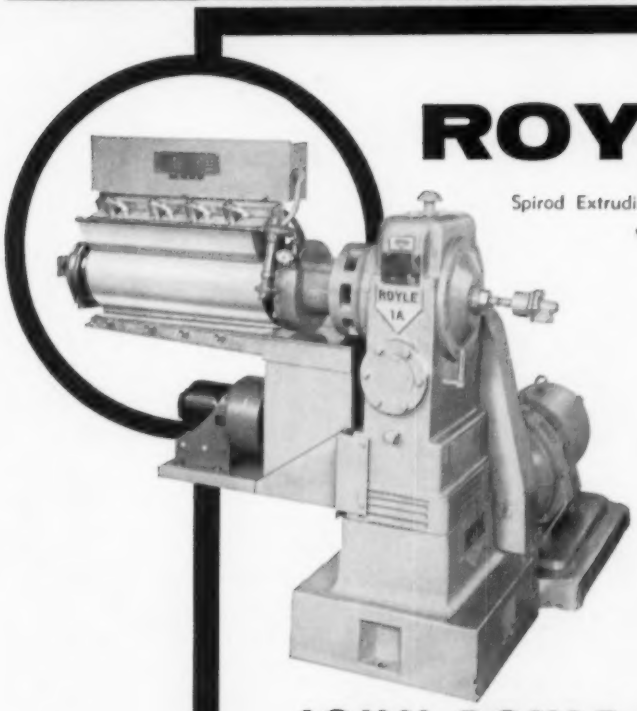
The **ELGOOD EMERGENCY KIT** consists of flexible, shock-absorbing hydraulic lines in working pressures from 7,000 psi to 2,000 psi, sizes from 1/4" to 2", with full range of couplings, adapters etc.

WRITE FOR CATALOG
ELGOOD MATERIALS CORPORATION
374 TEN EYCK STREET BROOKLYN 6, N. Y. • HY 7-5445

FOR FAST MOLDING CYCLES

TENITE
POLYETHYLENE
an Eastman plastic

EASTMAN CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE
subsidiary of Eastman Kodak Company



ROYLE 1A (2½" cylinder bore)

Spirod Extruding Machine with electric heating and high velocity evaporative cooling. An all-purpose extruding machine for processing rubber and plastics.
Available in sizes 1⅛" through 12" cylinder bore.

Strainers, Cooling Troughs, Light Wire and Cable Capstans, Motorized Take-ups, Temperature Control Units.

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

London, England — James Day (Machinery) Ltd. — Hyde Park 2430 - 0456
Home Office — V. M. Harvey J. W. VanRiper — SHerwood 2-8262
Akron, Ohio — J. C. Clinefelter — SWandale 4-5020
Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

that, when baked and cured, gives a decorative textured finish.

Reynolds Chemical Products Co., Ann Arbor, Mich., also recently announced the development of a technique for applying plastisol coating to a flat metal sheet, embossing the coating with any desired textured finish, and then forming or stamping the coated sheet into a finished product. Consumer goods making use of parts based on the coated-embossed sheets already include radio cabinets, window air conditioners, automobile dash boards and kick plates, wall panels, and filing cabinets—and Reynolds reports that several of the larger basic steel producers are actively evaluating the process.

In a typical production line as set up by Reynolds, the metal which feeds from a roll first goes through a thorough cleaning process. After cleaning, it passes through an automatic adhesive applicator (either spraying or roller coating can be used). The adhesive is then dried in a circulating air oven and cooled.

Immediately after cooling, the plastisol is applied to the sheet, again either by spraying or roller coating. (New equipment is reportedly available that can apply the plastisols to the metal sheet at the rate of 200 ft. per minute).

Forced-type ovens or infra-red or radiant heat lamps are then used to cure the material. While the coated metal is still hot, it passes through suitable embossing rolls, after which it is cooled and sheared.

The Future

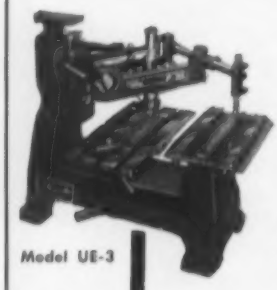
Development work in vinyl dispersion is by no means over. The chances are good that new formulations will be coming along that are even better, lower in cost, and easier to apply than many of those now on the market. It is already reported that a vinyl plastisol is currently being researched which can be applied and will adhere permanently to a metal surface without the need of a primer.

As one supplier expressed it, "engineering data, shop know-how, and design engineering are constantly finding extended usage for this material and, if only a small percent of the presently dreamed-of applications materialize, the vinyl field should grow to many times its present size in the very near future."

Credits: The editors wish to acknowledge the cooperation of the following raw material suppliers of vinyl paste dispersion resins: Bakelite Co.; Firestone Plastics Co.; B. F. Goodrich Chemical Co.; The Goodyear Tire & Rubber Co. Inc.; Monsanto Chemical Co.; and Naugatuck Chemical, Div. of United States Rubber Co.

Thanks also to the following suppliers of vinyl plastisol and organosol formulations: John L. Armitage & Co., Inc., Newark, N. J.; Dennis Chemical Co., St. Louis, Mo.; Michigan Chrome and Chemical Co., Detroit, Mich.; Reslac Chemicals, Inc., Chicago, Ill.; Reynolds Chemical Products Co., Ann Arbor, Mich.; The Stanley Chemical Co., E. Berlin, Conn.; United Chromium Div., Metal and Thermit Corp.; Watson-Standard Co., Pittsburgh, Pa.

For a complete listing of all suppliers of vinyl dispersion resins and organosol and plastisol formulations, see the Directory section of the 1955 edition of MODERN PLASTICS Encyclopedia.—END


Model UE-3

the "PANTO"
2 and 3 DIMENSIONAL
ENGRAVERS
"can take it"

They are high precision small machines that do the work of machines costing much more.

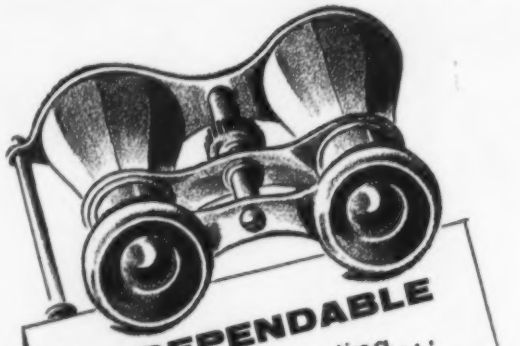
They are available in several sizes from small bench models for fine engraving on small plastic parts to floor models for engraving large panels and signs. 2 and 3 dimensional PANTO Engravers are precision made for work on plastics, metals and steel, including steel stamps, dies and molds.

- For PLASTICS
- For METALS (all non-ferrous metals).
- For STEEL (all ferrous metals, including alloys).

Write for new color folder listing the PREIS-PANTO line of Engraving Machines and Accessories. For immediate attention write directly to manufacturer below. Ask for nearest representative.

PANTO TRADE-MARK

H. P. PREIS ENGRAVING MACHINE CO.
653 U. S. Route 22 Hillside, N. J.



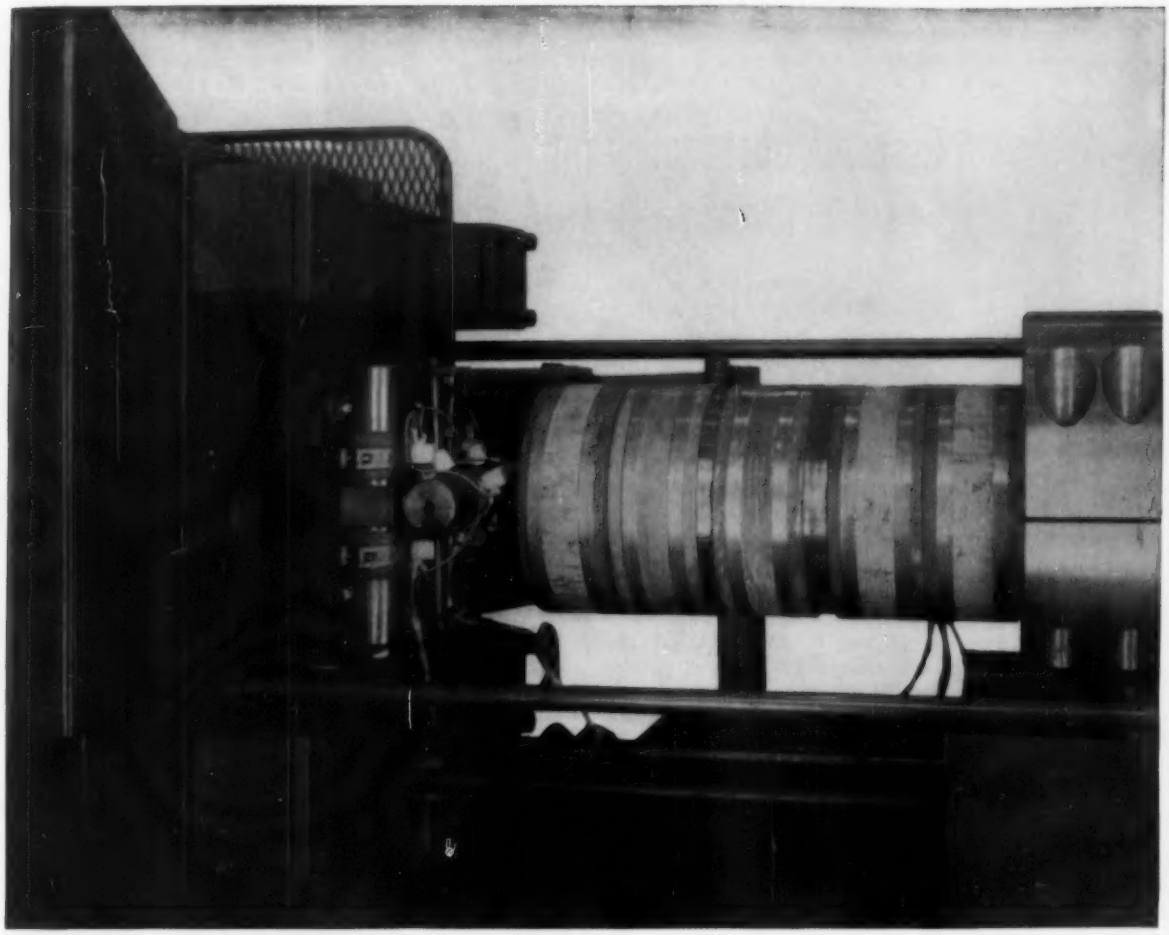
For DEPENDABLE Custom Molding... Look to KINGMAN

Kingman offers a complete design, engineering and molding service that assures you top quality results. And it's all experience... experience that has been product-proved time and time again. Kingman's skills and facilities guarantee the success of your sample or production runs. Write today for quotations. There's no obligation.

Injection Molding
Design Service
Fabrication
Model Making
Mold Making
Extrusion

"A Complete Custom Molding Service"

E. B. Kingman CO., INC.
96 Exchange St., Leominster, Mass.



Now Molding – 1200 Parts Per Hour

No Runners
No Sprues
with
FOUR EXTERNAL HOT RUNNER NOZZLES
Developed by IMPCO

For every pound of powder going into the mold, a pound of molded parts comes out! No material to reclaim with subsequent shrinkages and contamination. The multiple nozzle arrangement can be readily disengaged from the die permitting instant clearing in case of plugging from foreign material. There is no insulation problem as only the tips of the four nozzles make contact with the die.

May we offer a demonstration

IMPCO

IMPROVED MACHINERY INC.

NASHUA, NEW HAMPSHIRE

Now . . .

a Market Research Organization that Specializes in Plastics

Top management men will recognize at once how this new organization can help them to chart profitable new areas of operations in the fast-moving, fast-growing plastics field.

Background Facts. More and more companies are investigating plastics with an eye to developing new product lines, new sales outlets, new and promising openings for capital investment. The reasons make sense: plastics are a still new and constantly growing family of basic manufacturing materials, that are tied to many growth industries with a host of vital product applications.

Nevertheless, the prudent executive charged with the shaping of company policy does not proceed rashly . He knows that the plastics field is complex. To steer his company on a knowledgeable course calls for informed and highly *specialized* research by experts who *know* the plastics field. It is just this kind of service that Modern Plastics Research Corporation provides.

What the Company Is. The firm is unique in the field of business research. Its expertness in the field of plastics is unmatched. The staff is composed of specialists in all facets of the subject: present and potential applications, trends and developments in materials and technology, marketing and merchandising, financing and administration.

Moreover—and most significantly—*the firm is directly affiliated with Modern Plastics magazine.* It has full recourse to the accumulated experience, background and knowledge of that publication.

How to Use Its Services. If you are currently looking for a fresh approach to your own program of company expansion—or if you feel the need for thoroughly researched facts concerning your current operations—then you should arrange *now* for a preliminary consultation with a principal of this company.

Such a meeting places you under *no obligation*—yet enables you to estimate *in advance* the value that a full analysis can bring to your company.

All communications and inquiries held in strictest confidence.

MODERN PLASTICS RESEARCH CORPORATION

575 Madison Avenue New York 22, N. Y.

Kentucky Color

AND CHEMICAL COMPANY, INC.

DRY COLORANTS *for* **PLASTICS**

●

CADMIUM YELLOW TONERS

CADMIUM RED TONERS

PHTHALOCYANINE BLUE

PHTHALOCYANINE GREEN

ORGANIC REDS

ALSO CHROMATES

Color Matching Service

Offices and Agents in Principal Cities

Main Office and Plant

LOUISVILLE 12, KENTUCKY

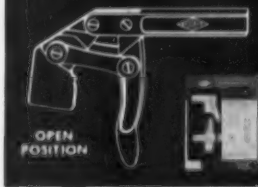
announcing 2 NEW

DE-STA-CO

TITAN Toggle Clamps!

(Models 557 and 558)

- THE ULTIMATE IN RUGGED CONSTRUCTION
- completely replaceable parts
- forged steel components
- 4,000-lb. holding pressures
- weight of 4½ pounds!



(Model 557 is the same as Model 558 except that Handle-angle provides complete clearance)

Send for **FREE Literature** on these new DE-STA-CO Titans—Models 557, 558!

DE-STA-CO DETROIT STAMPING COMPANY

WORLD'S FIRST LINE OF TOGGLE CLAMPS

327 Midland Avenue • Detroit 3, Michigan

Small-Fry Special

(*From pp.* 110-111)

pleasant contract was obtained from Wilson Sporting Goods Co. for practice golf balls. The same balls are used as a basis of locomotion for an amusing bovine pull toy and for "Happy the Hilarious Horse." They are also used as basic parts of construction toys. Tigrett puts a bell in a polyethylene ball and it becomes a toy for pets. Eight balls on an elastic string act as a carriage guard for infants, and a ball with a bell in it forms the principal part of baby rattles. In all, twelve separate products use the sealed polyethylene ball with holes in it.

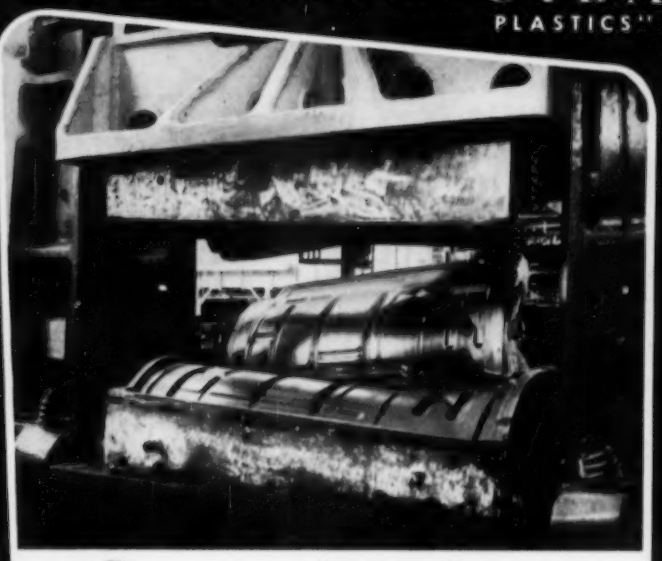
Two other main polyethylene toys are in the new line. One is the "Imaginator," developed by Senator Nat Washington of Ephrata, Washington. It provides a child with three-dimensional "doodling," being made up of nine pieces of molded polyethylene, which can be bent and rebent into countless forms. Another is "Rolling Joe," the first in a new series of "memory motor" toys. A goofy looking character sticks his neck out of a miniature sports car which invariably returns to the point whence it was pushed.

The new type of motor was developed by Edwin Foster and, in the opinion of the Tigrett organization, provides one answer to the cheap metal toys being imported from Japan and Europe.

This manufacturer's aggressiveness in using plastics properly to combat foreign competition is indicated in the following statement: "There is no reason, in our opinion, regardless of wage scales, why we cannot be ingenious enough in this country to retain our own toy market." It is the company's ambition to provide the American preschool child with plastics toys that will have a better feel and appearance than foreign metal toys, that will be more durable, and that will offer more play value.

CREDITS: Toys molded in Tigrett Industries' plant on Fellows 3-oz. machines. The following outside molders provide some components: Decatur Plastic and Engineering, Inc., Decatur, Ala.; Engineering Products, Inc., St. Louis, Mo.; Como Plastics, Columbus, Ind. Polyethylene molding material from Eastman Chemical Products Inc., Kingsport, Tenn.; and Spencer Chemical Co., Kansas City, Mo.

"IDEAS IN THE MAKING WITH CIBA PLASTICS"



Hear this!

An outstanding development of great significance in the use of synthetic resins for tooling is this new drop-hammer die at the Lockheed Aircraft Corporation. The high impact die facing material is EPOCAST*, developed by FURANE Plastics based on CIBA Araldite Epoxy Resins. It is hard enough to form most gages of aluminum and thinner stainless steels. In addition to exceptional mechanical efficiency, the EPOCAST facing material economically eliminates die-grinding and spotting that is needed when conventional tools are used. Worth looking into . . . as are *all* CIBA-base plastics. *Trade Name

Do this!

Save 50% of your tooling costs by writing us for full information.

CIBA ARALDITE® Epoxies

CIBA COMPANY INC.
Plastics Division MP-11
627 Greenwich St., New York 14, N. Y.
Please send me further information on
☐ Epocast Resins based on Ciba Epoxy Resins
☐ Ciba Epoxy Resins
Name
Company Title
Address
Type of Business

METALLIZED
THERMOPLASTIC SHEETINGS

In every field, manufacturers are using Gomar metallized sheetings to make better looking, far less expensive products and components — speaker grilles, trim for electrical appliances, picture frames, trademark plaques, dimensional replicas of metal products for display, toys and toy parts, costume jewelry, ornaments, packaging and novelties.

This amazing, tough plastic looks like metal, retains its brilliant finish indefinitely. Saves production costs because it eliminates costly metal plating of clear plastic. In gold, silver, bronze, copper, steel, aluminum colors; and metallic reds, greens, blues, and yellows.

Send for free color chart and literature.

GOMAR
MANUFACTURING COMPANY
79 Paris St., Newark 5, N. J. MArket 3-1967

Quality Control

(*From pp.* 117-120)

reached as to whether to accept or reject the lot. A clear explanation of this and other sampling plans will be found in Grant's "Statistical Quality Control," Ch. XV (see bibliography).

Results

By following a molded part through the outlined program of controlled quality, the following results can be achieved:

1) It can be determined before quoting that the part can be molded to the customer's specifications, or he can be advised of any tolerance modifications necessary.

2) The precise shrinkage allowance required for construction of the mold can be predicted accurately.

3) The exact tolerance which can be allowed in the construction of the mold can be determined in advance.

4) It can be determined that samples submitted to the customer are "typical" of those which the mold can be expected to produce.

5) Errors, if any exist, can be properly evaluated.

6) In-process controls can be instituted where necessary, providing considerable insurance against rejected parts.

7) Scientific sampling techniques can provide a high measure of confidence that lots will not be rejected.

8) Finally, and perhaps most important, a more thorough understanding of the capabilities and limitations of the molding process can be acquired.

Bibliography

"Statistical Quality Control," available from Marchant Calculators, Inc., Oakland 8, Calif. (49 pages).

"SPE Journal," September 1954 through June 1955.

"Statistical Quality Control," E. L. Grant (McGraw-Hill).

"Quality Control Principles, Practices and Administration," A. V. Feigenbaum (McGraw-Hill).

"Quality Control Handbook," J. M. Juran (McGraw-Hill).

"Quality Control Methods," C. W. Kennedy (Prentice-Hall).

"Quality Control and Statistical Methods," E. M. Schrock (Reinhold Pub. Co.)—END

Premixes

(*From pp. 125-131*)

flow, easy release from the mold, and molded parts of optimum strength and serviceability, the following factors should be considered in the design of articles:

1) Abrupt changes in wall thickness, as well as flow from thin to thick sections, should be avoided.

2) Square corners should be eliminated and replaced by flowing curves and generous radii.

3) Extremely thin sections or thin ribs should not be incorporated. Minimum thickness should be approximately 1/16 inch.

4) Undercuts should be avoided. If an undercut is essential, it can be produced in a multiple piece mold; however, this greatly increases mold cost and often also increases cycle time.

5) Molded-in holes should be eliminated if possible. When such holes are necessary, it is best to design a hole partially through the article, then drill it to completion after molding. This permits a better flow of glass. If core pins are used, they should be located far enough from the edge to allow the material to knit after flowing around the pins.

6) Sides should be tapered to provide easy removal from the mold.

7) Bosses designed to be tapped for screw attachment or molded-in inserts should be of sufficient diameter to distribute stress adequately.

Mold Cost

Except for specific articles, mold cost is difficult to estimate. It is affected by the type and complexity of the mold, and by the presence of core pins and ejection devices. It is best to discuss matters of mold cost with an established mold maker.

In charging a mold with polyester premix compound, a certain amount of preforming is desirable to remove air from the charge and to provide the proper flow of material, thus insuring maximum strength in the molded part. Preforming may be accomplished by hand, in an arbor press or hand-operated forming mold, or with a power-operated extruder. Since extrusion aligns the glass fibers in one direction, unidirectional strength results unless a special loading technique is developed. Both ram type and continuous screw type extruders are being used satisfactorily. Excessive build-up of heat from friction should be avoided as this may result in pregel. Heating the extrusion die to 130 to 140° F. improves surface of the material.

The closed mold cycle depends upon curing temperature, nature of the resin, and maximum wall thickness of the part. Curing temperatures range from 250 to 300° F. and closed mold time from 30 sec. to 5 minutes. This is a generalization and not applicable to special cases requiring modified flow characteristics on account of size, thickness, etc.

Handling and Finishing

Proper handling of the cured article after removal from the mold is of the utmost importance. While the part is hot, it is comparatively weak and can be easily fractured or distorted. Simple cooling jigs do much to prevent warpage.

Most finishing and trimming operations can be performed on standard metalworking equipment. Tools for drilling or milling should be carbide tipped. Cutting is best accomplished on a wet abrasive cut-off wheel. Dry sanding operations produce a large quantity of fine dust and should, therefore, be conducted under a hood equipped with power exhaust.

The variation in physical properties of premix molded parts is greater than is encountered with preform or mat molded parts. Considerable care must be taken to obtain representative test values and these should be presented as a range rather than an average. It is recommended that the selection of premix be based upon serviceability rather than upon physical properties.

"Toughness" is an extremely important property and is not defined by the common physical tests. Also, certain test values tend to be somewhat misleading. For example, the force necessary to completely fracture a part, as measured by the Izod notched impact test, is usually several times the force required to produce an initial crack. Some typical physical properties obtained on simple Plaskon polyester premix formulations appear in Table III, p. 131. PE-40 is a rigid diallyl phthalate monomer resin of 400 poise viscosity. PE-55 is a resilient vinyltoluene monomer polyester resin of 25 poise viscosity.—END

3 New MARVINOL RESINS

broaden your choice of PVC processing qualities

	MARVINOL VR-10	MARVINOL VR-20	MARVINOL VR-21
Description	General Purpose.	Film Calendering.	Cold, dry premix for calendering film and sheeting.
Special Features	Highest molecular weight. Low deformation at highest temperatures. Very fast mill or Banbury mixing. Good for foaming and dispersion applications. Good for blown extruded film. High speed extrusion.	Medium molecular weight. Recommended primarily for calendered film. Behaves well in hot or cold premixes. High bulk density for large Banbury charges.	High molecular weight, cold, dry premixing resin. Leaves mixers clean, minimizing color changeover problem. Recommended primarily for calendering film, sheeting and coated fabrics.
Resin Properties			
Specific Viscosity	0.52	0.38	0.44
Average Apparent Density, lbs/cu. ft.	26	32	22
Average Particle Size, microns	6	32	11
Acetone Solubility	20	37	31
Specific Gravity	1.40	1.40	1.40
Compound Properties* **(100 parts resin, 50 parts DOP)**			
Shore "A" Hardness	82	78	80
Tensile Strength, psi	2900	2600	2800
Ultimate Elongation, %	340	360	360
100% Modulus, psi	1475	1300	1425
Tear Strength, lbs/in.	480	430	460

MARVINOL DATA REQUEST FORM

NAUGATUCK CHEMICAL,
Div. United States Rubber Company, Naugatuck, Conn.

Please send Technical Data on Marvinol resins checked at right.

Name.....Title..... ☐ VR-10 ☐ VR-20 ☐ VR-21 ☐ VR-22 ☐ VR-24 ☐ VR-30 ☐ VR-50

Company.....

Address.....

City.....Zone.....State.....

☐ Do (☐ Do not) have your Technical Representative call on me.

*Compound properties shown above are intended primarily for comparison with other Naugatuck resins, all of which are tested on the same equipment. Comparison with similar figures on resins of other manufacturers can be very misleading, since values obtained with different testing equipment may vary widely, even though the same methods are used.

HERE'S the current family of MARVINOL vinyls, industry's most complete line of straight polyvinyl chloride resins! Whatever your processing equipment . . . whatever your end product, there's a MARVINOL resin ideally suited to your needs!

For instance, do you want an easy-processing calendering resin designed especially to permit lower temperature operation? Then choose the new MARVINOL VR-24. If you're looking for a dispersion resin that readily stirs into plasticizers, there's the new MARVINOL VR-50. If it's a good electrical grade resin you need, MARVINOL VR-22 is approved by Underwriters' Laboratories, Inc.

Faster calendering? Larger Banbury charges? Easier dry blending? Choose the right MARVINOL® resin and they are yours!

May we send you Technical Data Sheets on any of these outstanding PVC resins? There's a form below for your convenience.

MARVINOL VR-22	New MARVINOL VR-24	New MARVINOL VR-30	New MARVINOL VR-50
Electrical Grade. Hot, dry blend for extrusion.	Easy processing and calendering.	Cold, dry premix for coated fabrics, film, sheeting and calendering.	Paste Dispersions.
High molecular weight with high bulk density for large Banbury charges. Excellent hot, dry blending properties for extruder feed; reduces mixing cycles. Approved by Underwriters' Laboratories, Inc. for electrical applications.	Low molecular weight with high bulk density, designed for low temperature calendering. Can be hot dry-blended. Can be used in semi-rigid compounds.	Medium molecular weight, low bulk density. Minimizes mixer clean-out problems. Mills and Banburys rapidly. Particularly good for most phases of calendering: film, inflatables, sheeting and coated fabrics. May be heat sealed. Excellent for injection molding.	Stirs into plasticizers readily to form pastes of good shelf life and excellent viscosity characteristics, for cloth-coating, dipping, slush molding, film casting, spraying and rotational molding. Makes excellent organosols.
0.44	0.30	0.38	0.50-0.52
27	33	21	15-19
22	25	15	—
25	51	46	—
1.40	1.40	1.40	1.40
			Physical Properties 6 mil Film, 380° F. (100 parts VR-50, 66.6 parts DOP)
80	77	78	
2800	2200	2800	
340	270	350	Tensile, psi 2700
1500	1300	1450	Elongation, % 280
450	370	410	100% Modulus, psi 1300

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

BRANCHES: Akron • Boston • Gastonia, N. C. • Chicago • Los Angeles • Memphis • New York • Philadelphia • IN CANADA: Naugatuck Chemicals, Elmira, Ontario
Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices • Cable Address: Rubexport, N. Y.

Increase Value...
Stimulate Sales...

with Beautiful

G.M.C.

Process Gold and Silver

DESIGNS

Special patented process decorates any plastic product with permanent electrolytic deposits of sterling silver or 14 kt. gold. Limitless variety of design—from broad expanses of silver to intricate gold filigree—increases value of your product, gives it greater eye appeal, broader sales appeal.

For proof without obligation, send a sample product. Let a radiant, luxurious, G.M.C. precious metal design demonstrate the astounding sales potential of products adorned by this unique new process.

- Cost per unit for luxurious G.M.C. decoration is surprisingly low—yet retail tags may often be doubled or tripled.
- There's literally no limit to the delicacy of pattern that can be applied to any plastic material.
- Specific patterns can be fashioned for appeal to either men or women.

G.M.C. PROCESS CORP.

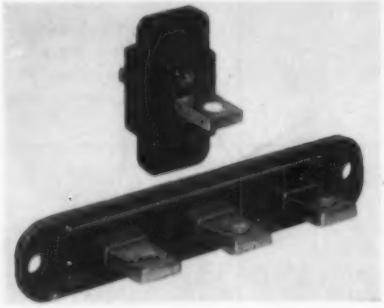
No connection with General Motors Corp.

718 Broadway, New York 3, New York

GENERAL ELECTRIC chose

THERMAFLOW 2400

polyester-glass compound for this long-wearing, heavy-duty electrical part



General Electric Co., Switchgear Div., brought the following rugged "specs" to Penn Plastics Co. of Glenside, Penna.: "We want a primary contact for a circuit breaker rated at up to 600 amps, 600 volts. The molding must be strong, have good electrical properties, and must be molded to very close tolerances. And it will have to withstand at least 30 years continuous service."

The item in the foreground is Penn Plastics' answer. It's molded of Thermaflow 2400, a 4 ft.-lb. electrical grade compound of polyester reinforced with glass fibers. It replaces the older phenolic part, shown in the background. Thermaflow 2400 was chosen for its high arc tracking resistance and excellent flame retardent characteristics. The great strength of Thermaflow 2400 permits thinner cross sections and more compact shape. And the molded-in inserts eliminate alignment problems, save on expensive assembly operations.

Thermaflow compounds are all pre-catalysed, pre-colored, pre-stabilized . . . ready-to-use! They flow easily, cure fast, are ideal for large parts with deep draws. Write today for additional information.

THERMAFLOW chemical corporation

Tunkhannock Pennsylvania

Highly Filled

(*From pp.* 133-138)

show that a 600% increase in glass concentration increases the flexural strength only 23% and the edgewise impact strengths 122%. Only where the higher properties are absolutely necessary can the use of the higher glass concentrations be justified.

References

1. "An Alkyd With Muscles," Modern Plastics *29*, 84 (Feb. '52).
2. Dietz, Albert G. H., "Glass-Fiber-Polyester Molding Materials" Preprints, Eighth Annual Technical and Management Conference, Sec. 6, pp. 1-5, S.P.I., Feb. 1953.
3. "End Users Look Ahead," Modern Plastics *29*, 118-27 (Mar. 1952).
4. Federal Specifications L-P-406b, "Plastics, Organic: General Specifications, Test Methods," Sept. 27, 1951.
5. "New Polyester-Glass Compound," Modern Plastics *29*, 94 (Apr. 1952).
6. O'Keefe, P., Jr., "Future of Reinforced Plastics Indicated by Use in Auto Body," Materials and Methods *35*, 109-11 (Apr. 1952).
7. "1952 Modern Plastics Encyclopedia," pp. 665-666.
8. Raech, H., "Reinforced Plastics; Industry Tries Them," Iron Age *170*, 140-1. (July 10, 1952).
9. Rose, K., "What Glass Fiber-Filled Molding Resins Have to Offer," Materials and Methods *37*, 87-89 (Jan. 1953).
10. Seymour, R. B., and Steiner, R. H., "Reinforced Polyester Plastics," Chem. Eng. *59*, 278 (Dec. '52).
11. Shannon, R. F., and Biefeld, L. P., "Highly Filled Glass-Polyester Plastics," Modern Plastics *31*, 125 (Dec. 1953).
12. Sheppard, H. R., "Polyester-Glass Molding Compounds," Modern Plastics *31*, 121 (Apr. 1954).
13. Slayter, G., "A Look at the Future of Reinforced Plastics," Proc. Seventh Annual Technical Session, Section 23, pp. 1-3, Reinforced Plastics Div., S.P.I., Apr. '52.
14. Sonneborn, R. H., "Fiberglas Reinforced Plastics," Reinhold Publishing Corp. (1954).
15. "Survey Reveals Wide Use of Plastics in Product Manufacture," Materials and Methods *31*, 45-6 (Mar. 1950).—END

"Experdo"

the new highly efficient low-cost electronic heat sealer

This "Experdo" 1500 watt output electronic heat sealer incorporates, among others, all these quality features: easy-to-use controls that permit quick adjustment of sealing cycle, sealing pressure, and electrode leveling; a new circuit protection design that eliminates any problem of burning or scarring of material due to arcing; a smooth-working counterbalanced foot pedal that serves as an automatic welding switch, leaving *both* the operator's hands free at all times. Also notice the large work-table area, simplified control panels, streamlined housing, and rugged over-all construction.

The new, low-cost Experdo sealer comes to you factory guaranteed. Write today for price and descriptive literature.

MONTAN EXPORT, INC.
17 Battery Place • New York 4, N. Y. • DI 4-1857

FOR BRILLIANT COLORS

TENITE
POLYETHYLENE
an Eastman plastic

EASTMAN CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE
subsidiary of Eastman Kodak Company

Modified Styrene

(*From pp. 150-157*)

2.5, which is normal for polystyrene. This value was almost independent of the frequency. The *D* material showed a somewhat higher dielectric constant, about 2.8. The *B* and *C* materials were very similar to each other and exhibited about the same dielectric constant as material *A*.

Measurements of tan δ showed for material *A* a value of 0.32×10^{-3} at a frequency of 0.15 mc./second. At higher frequencies tan δ increases and was found to be 1.4×10^{-3} at a frequency of 75 mc./second. These results accord well with those usually found for polystyrene. For the *D* material tan δ was found to be 7.2×10^{-3} and 4.2×10^{-3} at frequencies of 0.15 and 75 mc./sec., respectively. These values indicate that there are some polar substances present in the *D* material. It was also found that this material contained about 7% nitrogen. The tan δ values for the *B* and *C* materials were very similar to those for material *A*. The *C* material showed slightly lower losses at higher frequencies. This is evident from Fig. 2, p. 157.

It is well known that low water absorption in a plastic usually indicates that the material possesses good dimensional stability and good insulating properties. In this respect the modified polystyrenes are superior to many other plastics, as their water absorption is very low. The figures for the materials in question are shown in Table III. The *D* material has the highest water absorption, which is due to its nitrogen content. The lowest water absorption is to be found in the *A* material. Materials *B* and *C* seem to have about the same water absorption, and lie between materials *A* and *D*. In any case, all four materials have a low water absorption, as might be expected for these types of materials. It is to be anticipated, therefore, that, unlike cellulosics, they will maintain almost the same properties in dry and in humid atmospheres.

Table III—Water Absorption of Disks of Polystyrene and Modified Styrene Plastics

Material	Water absorption, 24 hr. at 25° C.	
	mg.	%
A	10	0.04
B	36	0.15
C	30	0.13
D	62	0.25

[a] Dimension of disks: thickness 3 mm., diameter 100 millimeters.

General Conclusions

General-purpose polystyrene is a very attractive material for many applications. It is relatively cheap and easy to mold. It has good dimensional stability and insulating properties. The drawback has been its brittleness. It now seems that the chemical industry, by producing new copolymers with styrene, is able to get rid of the brittleness without sacrificing other properties. Therefore, the new modified polystyrenes may be expected to compete with the cellulosics and their use in telephone housings is well worth trying.—End

THE PLASTISCOPE*

NEWS AND INTERPRETATIONS OF THE NEWS

By R. L. Van Boskirk

Impermeable Squeeze Bottles

LININGS, which coat the inside of polyethylene squeeze bottles and prevent permeation by the ingredients of such products as sun tan oils, cleansing creams, baby oils and lotions, hair tonics, and eucalyptol-containing pharmaceuticals, have been developed by Plax Corp., West Hartford, Conn. Permeation of these ingredients has in the past constituted serious obstacles to packaging these products in polyethylene.

Linings already commercially available from Plax have been successfully tested for mineral oils, lubricating oils, and water-in-oil emulsions. The bottle-in-a-bottle effect of the linings also reduces the permeation of a variety of essential oils so that products containing them will retain their taste and odor characteristics for practical shelf life periods.

The new material, which is invisible to the naked eye (it can be colored if desired, however), does not alter the appearance, feel, or characteristics of the lightweight, unbreakable container. The linings, which are developed for specific products, are subjected to accelerated shelf life tests by Plax before release to customers.

At present, linings are applied to round and other simple shapes with neck finishes of 18 mm. or larger, in capacities from 1 oz. up. Plax is now experimenting with the more complex bottle shapes and with other types of linings to contain a still wider range of materials.

Vinyl Acetate Facilities Expanded

CONSTRUCTION of additional facilities for the production of vinyl acetate at its Texas City, Texas, plant has been announced by Carbide and Carbon Chemicals Co., a Div. of Carbide and Carbon Corp. Completion of these multi-millon dollar facilities in the fall of 1956 will more than double the output of vinyl at the Texas City plant and will represent a substantial increase in national production.

The Texas City plant is a major producer of tonnage petrochemicals, including ethylene oxide, ethylene glycol, acetic anhydride, ethanol, acetone, vinyl acetate, and vinyl chloride. Vinyl acetate is made by reacting acetic acid with acetylene. The acetylene is produced at Texas City by the partial oxidation of methane at high temperatures—a process pioneered by Carbide and Carbon in the United States. The facilities for making acetylene by this process were completed in 1950—the result of five years work.

Binder for Paper Coating

ACRYLATE members of the acrylic family, especially those used in coatings for paint, paper, and other types of surface treatment, are making steady strides forward. There hasn't been much fanfare attached to their growth, although there seems to be no question that all potential competitors are keeping a wary eye for every announcement that is made concerning these versatile members of the acrylic family.

The latest item along these lines to be announced is Rhoplex B-15 which has been developed by Rohm & Haas Co., Philadelphia 5, Pa., especially as a high-quality coating for folding boxboards. According to the company, printing properties and good mechanical and chemical stability can be imparted to the paper by use of the new binder, which is an acrylate emulsion.

Standard clay and clay-titanium dioxide coatings can be formulated using this acrylate as the only binder for blends in alpha protein or casein. The binder has an unusually low viscosity so that coatings with higher than usual solids content can be formulated and applied with ease.

The product can be blended with other binders to reduce coating costs or to obtain working properties similar to those of protein-bound coatings. For example, a 1:1 blend of alpha protein and Rhoplex B-15 will have a bonding strength and brightness greater than that of either binder alone. Gloss, however, will be diminished in proportion to the percentage of protein present.

Polyester Resists Erosion

CAPABLE of producing fibrous glass-reinforced laminates with greater transparency than has previously been possible with conventional resins, a new polyester resin, called Paraplex P-444, has been developed by Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa. In the recommended blend with monomeric styrene or vinyl toluene, the refractive index of the cured resin (1.546 average) closely approaches the refractive index of glass (1.548).

Paraplex P-444 is designed especially for use in applications requiring resistance to discoloration by ultra-violet light, freedom from fiber evidence, and resistance to erosion on outdoor exposure. The resin is recommended for glass-reinforced corrugated panels, flat sheet, awnings, or other constructions where good weathering properties are required.

Since it is an unsaturated polyester containing monomeric methyl methacrylate, Paraplex P-444 *must* be blended with from 10 to 25% monomeric styrene or vinyl toluene to obtain adequate speed of cure and desirable physical properties. For optimum results, the recommended blend is 80 parts of Paraplex P-444 and 20 parts of added monomer.

Flame-Resistant Panels

LIGHT-TRANSMITTING panels of polyester resin reinforced with fibrous glass have been granted use of the Underwriters' Laboratories label. This guarantees that each of these panels has been produced under the Factory Inspection and Label Service Program of Underwriters' Laboratories, Inc. The only such panels so recognized are those using the fire-resistant polyester resin, Hetron, produced by Hooker Electrochemical Co., Niagara Falls, N. Y., according to a Hooker press release.

The first company to be granted use of the Underwriters' label is Resolite Corp., Zelienople, Pa., for

* Reg. U. S. Pat. Off.

◊ Marked samples of Lustrex Hi-Test 88 styrene, prior to testing on Baldwin-Southwark Universal machine.

◊ Elongation test in progress. Total elongation value of 28% was recorded for Lustrex Hi-Test 88.

Lustrex Hi-Test 88 is tough!

Elongation test proves amazing ductility of Monsanto's high impact styrene!

By submitting sample bars of plastic materials to a terrific tug-of-war, the Baldwin-Southwark Universal Tester can measure their elongation values.

In these punishing tests, sample bars of Lustrex Hi-Test 88 styrene achieved a total elongation value of 28%.

This phenomenal ductility is 30% greater than other leading high-impact materials tested—and from 10 to 15 times greater than general purpose styrene.

Lustrex Hi-Test 88 has other outstanding toughness features. It offers impact resistance up to 500% higher —and flexural fatigue values that are 15 times greater than unmodified styrene compounds.

You also get superior moldability and flow when you use Lustrex Hi-Test 88. Surface gloss and color stability are excellent. Suitable for injection and compression molding, extrusion and vacuum-forming.

For proof that Monsanto's high impact styrene can improve the quality and sales appeal on the products you mold, try Lustrex Hi-Test 88 on your next job. Write Monsanto Chemical Company, Plastics Division, Dept. MP-11, Springfield 2, Mass.

For superior toughness, specify **HI-TEST 88**

MONSANTO

LUSTREX Styrene Plastic

THE PLASTISCOPE

its fabricated panels tradenamed Fire-Snuf. Exhaustive flammability tests are required before use of the label is permitted. Other fabricators are now applying for the label.

The incorporation of Hetron resins allows the manufacture of fire-resistant panels for skylights, translucent siding, and partitions that cost less to install and maintain than conventional windows. Such panels will burn under a blow torch as long as a flame is applied but will snuff out when the flame source is removed. These panels now meet the safety requirements for most factories, schools, institutions, and other areas where stringent fire codes must be observed. Hetron translucent panels are weather resistant and stable to sunlight.

Fire-Snuf panels are classified in the "slow-burning" category as defined by the Building Officials of America. Underwriters' Laboratories gives these panels a flame spread rating of 75 or below in its classification system. By comparison, the rating for plastic wall tile is 170, it is 255 for cellulose board, and above 500 for veneered woods.

Glass Boats

ESTABLISHMENT of a new plant in Union City, Pa., to complete and market fibrous glass-reinforced plastic boat hulls has been announced by Molded Fiberglas Body Co., Boat Division. With its modern equipment, the 110,000-sq. ft. plant will provide trimming and finishing facilities for the firm's annual capacity of 10,000 boat hulls, according to R. S. Morrison, president.

The 15-ft. 7-in. fibrous glass hulls, made by a new process using preforms and matched metal dies, are said to produce stronger boats than have hitherto been available, at considerably lower cost. The new process makes these one-piece seamless simulated lapstrake boat hulls in a single molding operation at the rate of 4 to 6 hulls per hour on one of the largest hydraulic presses ever built.

Newest boat produced by the company under the tradename of Molded Fiber Glass, is 15 ft. 7 in. long, with a 68-in. beam and 30½-in. maximum depth. It is designed in a simulated lapstrake construction with cross-ribs of parallel strand fibrous glass-reinforced plastic. Gunwales, decks, transome covers, seats, and keels are of topgrade mahogany.

The new boats are now available for immediate delivery in three models at $395, $420, and $475.

Another Raw Material?

NEW low-temperature tars derived from the carbonization of lignite may be the source of a new supply of raw materials for the plastics industry. The new tars are a product of the Aluminum Co. of America's plant near Rockdale, Texas, where dried lignite and carbonized lignite are used for the first time in this country as a fuel for generation of power for the smelting of aluminum. No commercial quantities have been available heretofore.

A prototype carbonizer will produce 16,000 gal. of lignite tar a day when in continuous operation. A research and utilization program, based on this new material, is co-sponsored by Alcoa and Texas Power & Light Co., with a long list of chemical companies participating in the research and utilization program.

Samples may be obtained from Texas Power & Light Co., P. O. Box 6331, Dallas, Texas, which will be marketing the material for Alcoa.

A-D-M's Expanded Plastics Operations

AMONG the many products of Archer-Daniels-Midland Co., Minneapolis 2, Minn., as listed in its annual statement (which showed a net profit of almost $6 million in the fiscal year ended June 30), are several that should prove of interest to the plastics industry. Listed among its new pilot plant products are some unnamed, but "intriguing," fatty alcohols; a series of unsaturated hydrocarbons; alpha-olefins, iso-olefins, and beta-gamma olefins; soy flours for use in hardwood glues; and new resins for exterior paints. One of several new resins, Aroplaz 908, produces alkali- and oil-resistant finishes for home appliances and automobiles. Still another new resin is an ingredient for the ink used in ball point pens. It is also used as a metallic-type lining for clothing which can be dry cleaned.

Among the company's 150 products manufactured at its Newark, N.J., plant are alkyd resins, rosin esters, pure phenolic esters, maleic resins, and polyester resins. The Pensacola, Fla., plant, originally designed for the production of hard resins, now manufactures soluble resins which are used in protective coatings and for other products. It also produces phenolic resins used for shell molding in the foundry industry.

The vinyl plasticizer plant at Decatur, Ill., opened in 1953, processes a line of epoxy plasticizers called Admex and uses soybean as a base material. Deliveries have increased four-fold over the first year. Capacity of the plant has been doubled.

A new plant at Ashtabula, Ohio, is producing several new types of saturated and unsaturated fatty alcohols.

Chemical for Use with Epoxies

PRICES of alpha-methylbenzyl dimethylamine have been reduced considerably by Carbide and Carbon Chemicals Co., a Div. of Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y. The new prices are $1.89 per lb. for carload and truckload lots in drums, $1.90 per lb. for less than carload lots in drums, $2.00 per lb. for 5-gal. containers, and $2.15 per lb. for 1-gal. containers.

Alpha-methylbenzyl dimethylamine performs two different functions in the formulation of epoxy resins. As a hardener for casting and laminating applications, the chemical gives good "pot life" at room temperatures. However, it quickly cures epoxy resins when heated to temperatures ranging from 100 to 150° C. It also acts as a catalyst with phenolic-epoxy resin systems. Alpha-methylbenzyl dimethylamine "triggers" the curing action of the phenolic resin.

Du Pont Drops Poyethylene Film

COMMERCIAL production of polyethylene film has been discontinued by the Du Pont company.

Du Pont is currently expanding its cellophane production facilities so that most of the 30 employees now engaged in the relatively small polyethylene film operation at the Yerkes

Film Plant in Buffalo, N. Y., can be assigned to other duties in the plant.

Since adequate supplies of polyethylene film are available from some 30 manufacturers, Du Pont has elected to discontinue its manufacture and sale in favor of accelerated development work in other directions. The Film Dept.'s research and development efforts will be concentrated on other films, with particular emphasis on new developments in cellophane and Mylar polyester film.

Distribution

HOW to get good distribution for plastics products is still a serious problem with many plastics processors, even though they recognize the situation and have been trying to adjust it ever since the end of World War II.

A good example of how a proprietary molder is going about it comes with the announcement that Miraplas Tile Co., Columbus, Ohio, which claims to be the nation's "original and largest producer" of Styron wall tile, has appointed Rumsey Distributors, Inc., Hartford, Conn., as its distributor in Connecticut and western Massachusetts. The interesting angle is that Miraplas has found a distributor that handles kindred products, and therefore, has an entree into markets which Miraplas wants to reach. Rumsey products are carpets, carpet cushion, hard floor coverings such as linoleum, and rubber sponge of the type that is used for cushioning material. Dealers who handle those particular products are all eligible to become dealers of wall tile.

Plastics from Sugar

FOR many years chemists have been intrigued by the possibility of producing plastics from sugar. The latest to wax enthusiastic is Karl M. Herstein, New York chemist, who reported on his findings along these lines at a recent meeting of the American Chemical Society.

According to Mr. Herstein, one possibility has resulted from chemical reaction with urea. Mr. Herstein found that sucrose carbamates did not appear to be too promising, but that the reaction product from sucrose, urea, and formaldehyde can form a clear, colorless, hard resin of considerable promise.

He further stated that the work on this study led to the setting up of a

Cost Table: Paper–Films–Foil

FREQUENT queries on costs of plastics films in comparison with competitive materials has encouraged the compilation of this table which is being jointly published by the *Modern Packaging Encyclopedia* and *Modern Packaging* magazine. Readers will find it a handy guide for quick reference but are cautioned to note that the prices given in the table are subject to rapid change and should be checked with suppliers before final decisions are made.

Table of Comparative Costs*

Material[1]	*Cost per lb.*	*Yield, sq. in. per lb.*	*Cost per 1,000 sq. in.*[2]
Glassine			
Bleached, 25 lb.[2]	$0.23	17,240	$0.013
Lacquer coated, moistureproof, heat sealing, 28 lb.[2]	0.43	15,428	0.028
Laminated, bleached, 47 lb.[2]	0.28	9,191	0.031
Waxed paper			
Bread-wrapper grade, 39 lb.	0.22	11,080	0.020
Liner grade, moistureproof, amber, 31 lb.	0.22	13,935	0.016
Cellophane			
Moistureproof, heat sealing (300 MST)	0.56	19,500	0.029
(300 MST 51 or MS-1 type)	0.56	21,000	0.027
Moistureproof, water resistant (300 MSAT)	0.63	19,500	0.032
Cellulose acetate			
Cast (1 mil)	0.85	22,000	0.039
Extruded (1 mil)	0.71	22,000	0.032
Mylar polyester film			
(1 mil)[3]	2.50	20,000	0.125
Polyethylene (1.5 mil)	0.59	20,000	0.029
Pliofilm (1 mil)	1.10	24,000	0.046
Saran (1 mil)	0.95	16,300	0.058
Vinyl			
Cast (1 mil)	0.94	21,600	0.043
Extruded (1 mil)	0.94	21,500	0.044
Foil-acetate			
(1 mil[4]-1 mil)	1.30	6,490	0.201
Foil label stock			
(0.00035[4]-29 lb.)	0.42	9,195	0.046
Aluminum foil[5]			
Thickness, in.			
0.00035	0.73	29,200	0.025
0.0005	0.69	20,500	0.034
0.0007	0.64	14,600	0.044
0.001	0.61	10,250	0.059

* This comparison of approximate costs is intended only as a guide. The figures given were obtained from 1955 price lists and are based on "volume" orders varying from 500 to 1,000 or more pounds, depending on the material involved. The reader must bear in mind that costs are influenced by many factors, including variations in grade, gage, specific treatments, volume orders, market fluctuations, etc.

[1] Standard commercial grades, unprinted.

[2] Based on a ream of 500 sheets, 24 by 36 in., or 3000 sq. ft.

[3] A thickness of only ½ mil is said to be a typical gage for packaging applications. Cost of ½ mil Mylar is $3.00 per pound. Yield is 40,000 sq. in. per lb. and cost per 1000 sq. in. is $0.075.

[4] Aluminum foil.

[5] Unsupported.

THE PLASTISCOPE

project on the entire problem of plastics from sucrose, which is now being actively conducted at the Bjorksten Research Laboratories in Madison, Wis.

Mr. Herstein pointed out that the reductive aminolysis of sucrose is regarded as one of the most significant recent developments in sucrochemistry, the other two being sugar detergents and the South Puerto Rico sugar company's plant which is producing a material used by Du Pont in the manufacture of nylon.

Pipe and Hose

ASSETS of Industrial Synthetics Corp. and its wholly owned subsidiary, Supplex Corp., both in Garwood, N. J., have been purchased by American Hard Rubber Co. Supplex is a producer of vinyl chloride garden hose and lawn sprinklers. The company was one of the first to get into the business. American Hard Rubber started in business many years ago as a hard rubber molder and was known particularly for its Ace brand rubber products. The firm pioneered in production of saran pipe and now manufactures various types of plastics and hard rubber tubing, pipe, and molded fittings.

Albert A. Kaufman, former proprietor of Industrial Synthetics and Supplex, says that he will continue his activities in Supplex and has also joined the management group of American Hard Rubber.

Howard Shannon has been appointed vice president and general manager of Supplex. He joined American Hard Rubber in 1940 as a chemist and has been acting controller of the company since 1954. M. Robert Lustgarten is vice president-sales and J. L. Etkin, vice president-engineering.

Styrene Monomer Prices

TANK car and tank truck prices of styrene and vinyltoluene monomers have been reduced by The Dow Chemical Co., Midland, Mich. The company also announces that it is now allowing freight on shipments of both materials. Heretofore, these monomers were sold F.O.B.

The price of styrene N99 and styrene H99, polymer grades of monomer, have been reduced to 20½¢ a lb. and styrene RG, the rubber grade monomer, to 17¢ a pound. Vinyltoluene follows the same price schedule as styrene RG.

Colt's Sold to Penn-Texas

FIRMS desiring diversification continue to seek companies which are well established in the plastics industry as a part of their over-all build-up. Such an affirmative expression of confidence in the future of plastics is complimentary to the industry, but it adds to the confusion and uncertainty of future lines of development in an industry that is scarcely out of its teen-age years. What with mergers, vertical integration, and a never-ending stream of new materials, the plastics industry pattern is changing so rapidly from day to day that any man who dares to guess its eventual position in American industry is indeed a courageous soul.

Among the latest moves was the agreement by Colt's Mfg. Co.'s board of directors to sell its 118-year-old company assets to Penn-Texas Corp. Colt's is one of the oldest and best known thermosetting molders in the country. They were pioneers in the development of closures and containers for the cosmetics industry and have been custom molders of high repute for many years. Among their latest is a melamine container for aerosols now being readied for the market. The company may be better known among soldiers and the general public for its automatic pistols, Browning guns, and its commercial and industrial washing machines; but to plastics people, Colt's is synonymous with plastics molding.

Penn-Texas bought Colt's for stock with a market value of over $7 million. Assets were listed at about $8 million.

Penn-Texas was originally the Pennsylvania Coal & Coke Corp., Philadelphia, Pa. In 1952 it started a diversification program. The property now consists of four or more coal mines in Pennsylvania and Indiana; Niles-Bement-Pond, a machine tool company; Industrial Brownhoist; Quick-Way Truck Shovel Co.; Crescent Co., Inc., a wire and cable company in Pawtucket, R.I.; oil and gas operations in Pennsylvania and Texas; a uranium prospect in Arizona; and several small steamship lines. Operating revenue in 1953 was $10 million—total income was about $2 million.

Polyethylene Green House

EXPERIMENTAL use of a polyethylene green house has been announced by the University of Kentucky, Lexington, Ky. The green house is built with one layer of 1½-mil film inside the roof supports and one layer of 2-mil film on the outside. It has withstood without damage a 9-in. layer of snow; a glass roof collapsed under the same conditions.

A 28- by 100-ft. polyethylene green house, heat included, costs about $400.00. A glass one costs from $4000 to $5000. The outer layer of polyethylene is changed every year at a cost of $25.00 in order to prevent damage by weathering; the inner layer is changed every two or three years. The cost of changing is no more than the cost of replacing damaged glass panels.

Finishing Compound Price Cuts

PRICES have been cut as much as 45% on several Tumb-L-Matic dry process finishing compounds, according to an announcement by Tumb-L-Matic, Inc., 4510 Bullard Ave., New York 70, N. Y.

The six compounds involved in the price cut are used for cutting, smoothing, and giving a lustrous finish to plastics in Tumb-L-Matic's exclusive dry-process barrel technique for bringing out the virgin color of the plastic without waxes.

New Molding Company

ANNOUNCEMENT has been made of the organization of a new company, to be known as Brook Molding Corp., which will specialize in the design, engineering, and molding of plastics products and components. Facilities for the company, now under construction, will be located at 30 Industrial Way, Norwood, Mass.

The structure will house a full line of presses and auxiliary equipment capable of handling the entire range of commercial thermoplastic and thermosetting materials. Injection

"FULLY LOADED"

glass fiber reinforced
POLYESTER

DRYPLY

Mat, Glass Cloth or
PRE-IMP Molding Compound

"Fully loaded" means READY TO USE. Nothing to add—in either quantity production with matched metal dies, or low pressure lamination. "Fully loaded" FLEXFIRM uniformly pre-impregnated products speed up production by either method. They are quicker, more efficient, more economical—NOTHING TO ADD—READY TO USE.
For specific applications in your field, call, write or wire Engineering Department...

Shelf Life 6 months or longer

Flexfirm PRODUCTS

MAT DIVISION

2300 No. Chico Ave., El Monte, Calif. CUmberland 3-1173

THE PLASTISCOPE

capacity up to 16 oz. and compression capacity up to 300 tons will be offered.

The new company expects to be in production not later than January 1956.

Officers and executive personnel of Brook Molding are: F. Reed Estabrook, Jr., president and director; Colin M. Cunningham, vice president, sales manager, and director; Frederick K. Whiting, treasurer and director; William J. Mixter, Jr., sales engineer and director; and Gerald P. Dubuque, plant superintendent.

Packaging Symposium

SPONSORED by the New York section of the Society of Plastics Engineers, Inc., a one-day symposium on the subject of "Plastics for Packaging" will be held November 16, 1955, starting at 9:00 A.M., in the Hotel Statler, New York City.

The symposium will feature outstanding speakers on such subjects as materials (butyrate, styrene, vinyl, polyethylene, cellophane, and foamed plastics), processing techniques (injection molding, compression molding, extrusion, blow molding, vacuum forming, fabricating, printing, and sealing), and trends in the use of plastics by the packaging industry. A special feature of the symposium will be a speech by Lloyd Stouffer, editor of *Modern Packaging*, on "The Future of Plastics in Packaging."

In conjunction with the symposium, educational exhibits by leading materials suppliers will be on display.

Registration for the symposium can be made through the Society of Plastics Engineers, Inc., Suite 116-18, 34 East Putnam Ave., Greenwich, Conn. Registration fees for S.P.E. members are $2 (without lunch and dinner) or $10 (including lunch and dinner); for non-members, fees are $3 (without lunch and dinner) or $11 (including lunch and dinner).

Conductive Coating

AN ELECTRICALLY conductive transparent coating which prevents the formation of fog on the inner surface of aircraft windows and canopies has been developed by The Sierracin Corp., 1121 Isabel St., Burbank, Calif. The coating, called Sierracote, is also claimed to reflect up to 75% of solar heat rays.

The company states that with modern aircraft being designed for higher and faster flight, the problem of fogging is becoming increasingly critical. It has long been realized that a transparent conductive coating would offer many advantages over the cumbersome, heavy, hot air systems presently in use.

Although heatable coatings for glass windshields have been available to the aircraft industry for some years, such coatings have not been adapted to transparent areas of compound curvatures, nor have they been applicable to plastics. At present, Sierracote gives satisfactory results on glass and on polyester plastics such as Sierracin 611. Adhesion to acrylic plastics is not adequate at the present stage of development.

Liquid Plastic

IRREGULARITIES in molded plastic cases can now be repaired by using a liquid plastic developed by Allen Plastics Corp., 1015 E. 173rd St., New York, N. Y.

Called Alfil, the new material is claimed to be excellent for filling in the area between terminal poles and battery cases. Alfil is transparent, fast-setting, and creates a waterproof seam. It can be applied by brush, squeeze applicator, or flow gun.

Polystyrene in Floor Wax

FOR the preparation of self-polishing floor waxes, Union Bay State Chemical Co., Inc., Cambridge, Mass., has found a widespread acceptance of its ultra-fine particle size Ubatol U-2001 modified polystyrene emulsion in such formulations.

In recent advanced and intensive research along this line, the company has been conducting field tests on a new but similar product, known as Ubatol U-2002.

Like its U-2001 predecessor, U-2002 features extremely fine particle size but contains a higher concentration of solids. Comparative tests showed that U-2002 forms films having even greater flexibility than the films obtained with the older U-2001. It was also observed that U-2001 formulations required 33⅓% more plasticizer to equal the films obtained with the new U-2002.

Nitroparaffins

THE textile, surface coatings, petroleum, photographic, and chemical specialties industries will be the largest initial users of nitroparaffins now in commercial production at Commercial Solvents Corp.'s new plant at Sterlington, La., according to W. Ward Jackson, vice president in charge of the company's Petrochemicals Division.

The photographic industry is using nitroparaffins in the processing of film. Mr. Jackson states that the material will also find uses in agriculture as pesticides and in such other industries as plastics, cosmetics, pharmaceuticals manufacture, and aluminum and light metals.

Toy Promotion

CONSUMER promotion of toys made from Dow polystyrene will be conducted during 15-min. segments of the Home show on December 9 and 16 as part of NBC-TV's nationwide Christmas Festival. Arlene Francis, of the women's magazine-of-the-air, will discuss and demonstrate the newest toys available for the holiday season. Actual products of leading manufacturers of polystyrene toys will be shown on the program.

Dow commercials on the program will stress the durability and increased play value of the toys.

In addition, in-store promotional material, including window banners, counter cards, easels, stickers, and streamers will tie in the toy promotion at the retail level.

Impregnant for Enameled Wires

HEAT-REACTIVE insulation varnish for impregnating electrical coils for stationary and moving parts on Class B equipment has been developed by Schenectady Varnish Co., 200 Congress St., Schenectady 1, N. Y.

Known as Schenectady #99B, the varnish may be applied by any of the commonly used dip methods.

The #99B Varnish is completely heat-reactive and cures to a firm, dry, hard, tough mass in from 2 to 4 hr. at 275 to 300° F. It is particularly

well suited for application over any of the synthetic enameled magnet wires such as Isonel, silicone, Formvar, and nylon. Thermal stability is enhanced to a degree that 140° C. operation is readily possible with most coils.

Pliobond for Tobacco

AN ALL-PURPOSE plastics adhesive manufactured by The Goodyear Tire & Rubber Co., Inc., Akron 16, Ohio, has found a new use in the tobacco industry. The adhesive, called Pliobond, is applied as a sealant to close all crevices and openings in tobacco storage warehouses. This is done prior to fumigation of the stored tobacco as a pest control measure.

After the buildings are sealed with the adhesive, a vinyl coating, similar to those used by the armed services for putting military equipment in "mothball" storage, is applied. Hydrogen cyanide is then sprayed into the warehouses, completing the fumigating operation.

Because of its adhesion to wood, metal, and masonry surfaces, Pliobond provides a firm base for the vinyl coating that follows. Both materials are easily applied with spray-gun equipment.

White House Quote

PRESIDENT Eisenhower has his eye on the plastics industry. Note the following quotation from his remarks concerning the education of cadets at the Air Force Academy during his recent conversation with General Harmon regarding the advisability of a five-year course for prospective Air Force officers.

"If a school teaches any science, it ought to be physics and chemistry since we are living in a plastic age."

Anti-Fungus Tubing

A VINYL tubing, called Temflex 105, has been approved under Government Specification MIL-I-631B, according to Minnesota Mining & Mfg. Co.'s Irvington Div., Irvington 11, N. J. The manufacturer states that the tubing meets both the stringent fungus and heat requirements of the specification. It is listed as self-extinguishing and fungusproof.

Heretofore, the high dielectric strength, heat aging, and fungus resistance were considered contradictory. Temflex 105 is now claimed to surpass all requirements for this class of material. Recently, Irvington announced the improvement of its tubing by showing significant improvement in the heat deformation characteristics and greater resistance to "cut-through." The tubing has been approved by Underwriters' Laboratories for continuous operation at 105° C.

Eastman's Octyl Alcohol

TANK car quantities of its octyl alcohol are now in production at the new plant of Texas Eastman Co., a Div. of Eastman Kodak Co., in Longview, Texas.

Eastman has decided to market the new alcohol under the name 2-ethylisohexanol because of the high concentration of this particular isomer in the product. (During the development stage it had tentatively been called iso-octyl alcohol).

The price of 2-ethylisohexanol is 21¢ a lb. in tank cars, with the usual mark-up for smaller quantities.

New Automatic Compression Press

AS A result of the demand for its newly designed 50-, 75-, 100-, and 150-ton presses, claimed to be the first completely new automatic compression presses to be introduced to the plastics industry in years, Baker Bros., Inc., has moved its Plastic Press Div. into larger quarters at 1000 Post St., Toledo 10, Ohio.

The new facilities will permit closer association between sales and engineering, will result in an increase in production, and will also provide room for further expansion.

Personnel in the Plastic Press Div. are: T. L. Hallenbeck, vice president and general manager; N. W. Oberle, merchandising manager; Larry Ninneman, development and service manager; and John Hoenig, design and production engineer.

Tape for Air Conditioning

INSTALLATION of heating and air conditioning systems can now be simplified by the use of a tape developed by Permacel Tape Corp., New Brunswick, N. J. The new product, called Permacel 691 Silver Cloth Tape, was tested especially for the sealing of duct work in heating, ventilating, and exhaust systems; for holding building insulating materials; and for bundling sheet materials.

Permacel 691, a plastic-coated, cotton cloth-backed tape, is 0.014 in. thick, with a tensile strength of 55 lb./in. and tear strength of 500 grams. The tape is said to provide an effective seal against air leaks, as well as the dust which accumulates in buildings and provokes allergies.

Previous to the development of Permacel 691, many different types of pressure-sensitive tapes had been used for duct sealing with varying degrees of success. Some of the problems that arose were lack of adhesion in cold weather, difficulty in unwinding the tape, and need for using elaborate cutting devices.

The tape adheres and conforms to the job at low temperatures, facilitating work during winter construction. One contractor has estimated an 80% labor saving in joining pipe. The saving was effected mainly by the elimination of tapping holes and inserting metal screws.

Correction

IN THE Plastiscope section of the July issue of MODERN PLASTICS, mention was made of a new standard red (PSP 70) for polyethylene selling at a new low price of $2.75 per 100 pounds. Unfortunately, this was an error and the manufacturer, Ferro Corp., Cleveland 5, Ohio, has asked us to advise our readers that the price of the standard red should have been quoted as $2.75 per lb. in 100-lb. quantities.

PLASTICIZER NEWS

Polycon Plasticizer—A low-cost phthalate plasticizer, called Polycon #40, has been developed by Brown-Allen Chemicals, Inc., P. O. Box 1, Staten Island, N. Y. The plasticizer, which sells for 26¢ a lb., was developed as a replacement or an extender for the higher cost DIOP-DOP type. Use of the following recipes results in like finished formulation properties:

Resin	100	100
DIOP	20	50
Polycon #40	40	—

Polycon #40 can be supplied in a blend with other plasticizers where desired in order to minimize handling difficulties on the part of the customer.

For use in plastisols, Polycon #40 is claimed to be superior to DIOP and DOP due to excellent viscosity stability in low plasticizer formulations. The plasticizer is also said to be an excellent extender for the epoxidized soya type plasticizers in

THE PLASTISCOPE

certain formulas, especially in vinyl floor coverings. The use of this new plasticizer materially aid flex life witnout adversely affecting Durometer hardness.

Samples of current production are available from the company.

Eastman Chemical Products' New Plasticizer—Plasticizer 84, a new octyl butyl phthalate designed primarily for use in nitrocellulose formulations such as those used to coat wood, paper, metals, and cloth, has been developed by Eastman Chemical Products, Inc., Kingsport, Tenn. Comparable to dibutyl phthalate in many respects, the new plasticizer is asserted to be superior to the older compound in several properties of major importance to potential users.

Plasticizer 84 is claimed to provide nitrocellulose lacquers with greater permanence, better heat sealability, and outstanding cold check resistance. Nitrocellulose lacquers incorporating the new plasticizer are comparable to those made using dibutyl phthalate in all other significant properties, such as low-temperature flexibility, print resistance, blocking resistance, exudation, and hardness.

Plasticizer 84 is not compatible with polyvinyl acetate.

Price Reduction—A price cut of 3¢ a lb. on HB-40, an extender-type plasticizer, has been announced by Monsanto Chemical Co.'s Organic Chemicals Div., St. Louis, Mo. Under the new price schedule, the compound will be sold on a delivered basis.

HB-40 is used as a secondary plasticizer in polyvinyl chloride formulations. Other uses are as an extender plasticizer in plastisols, in asbestos-filled vinyl floor tile, and in filled extrusions including those of SPT wire.

Monsanto's Plasticizers for Foam—An experimental license has been obtained from Elastomer Chemical Corp. by Monsanto Chemical Co. The latter company will thus be in a position to experiment with plasticizers in vinyl chloride formulations used for the Elastomer foam process.

Formulations for foam are roughly 60% resin and 40% plasticizer. By changing the plasticizer, it is possible to develop variable formulations with such properties as density, hardness, stability, etc., tailor-made to fit the particular use for which the foam is intended. Monsanto will develop formulations and furnish technical service for foam producers who operate under the Elastomer process. They are *not* entering the business of making vinyl foam.

PIPE NOTES

Butyrate Pipe in Service—Various uses and advantages of transparent, cellulose acetate butyrate pipe are illustrated in a brochure recently published by Busada Mfg. Corp., 58-99 54th St., Maspeth 78, N. Y. Since interest in plastics pipe is constantly growing and since competition is rife between the various materials in use, it is interesting to note the advantages and uses claimed by Busada. This is how they are listed in the brochure:

Butyrate pipe can be lowered into an ungraded ditch without heavy equipment; it does not clog with paraffin in oil well installations; when used to carry petroleum from well head to separators, a transparent manifold for visual inspection can be easily fabricated; it resists corrosion deposits in a salt water filtering system; it can easily be joined to metal pipe or tank with standard forged steel flanges; it offers low maintenance cost and long life as a conveyor of natural gas; it facilitates observation of the flow and possible stoppage of waste disposal from an acid neutralizing system; if subjected to extremely heavy loads in conduits, it can be inserted in and protected by a reinforced concrete envelope; and it is being used to convey well water which is corrosive because of carbon dioxide content.

Working pressure of this pipe is represented as varying from 50 to over 100 p.s.i., depending upon wall thickness and temperature to which it is exposed. It is *not* considered a high-pressure pipe any more than other plastics pipe.

Price to the end user of Busada butyrate pipe, which is made in standard steel pipe dimensions, would be from 62.5 to 75.6¢ per ft. for 2-in. O.D. pipe, depending upon wall thickness. Four-inch pipe would vary from $1.44½ to $2.23 per foot.

Busada Co. reports that a recent installation of its pipe was for Long Island Light Co. in a new power station at Island Park, L. I., where over 1000 ft. of 3-in. pipe is being used as underground conduit for intercommunication lines.

Fittings and Tubing for Instrumentation—A new line of instrumentation fittings made of unplasticized polyvinyl chloride, and for use with them, and flexible vinyl tubing has been introduced by Tube Turns Plastics, Inc., Louisville, Ky. They are designed for long service life and are especially useful where corrosive atmospheres exist.

The fittings and tubing can be employed in the instrumentation of chemical plants, hospitals, experimental laboratories, and in food, drug, and beverage processing.

The company states that the new products permit an entire assembly to be put together by hand without the aid of wrenches, flaring or bending tools, or stretchers. No sleeves or ferrules are involved. All that is needed is a knife or scissors to cut the tubing to the proper length.

The new P.V.C. fittings will hold burst pressures in excess of those to which the flexible tubing may be subjected, and they cannot be overtightened by hand.

The fittings and tubing are furnished in both ¼- and ⅜-in. sizes. Various types of fittings are available for immediate delivery.

Institutional Sprinkler System—A large sprinkler system has been installed in the grounds of the new Porterville State Hospital, Porterville, Calif. Some 90,000 ft. of butyrate pipe were used on the project. Pipe sizes ranged from 3 in. for sprinkler lines to ¾ in. for the smallest feeder lines.

The pipe was extruded by Plastipipe, Inc., Los Angeles 45, Calif.

New Plant—A large steel pipe plant will be built in Saskatchewan, Canada, by Hoesch, a big German

PVC RESIN

vipla

PLAY SAFE AND SAVE BY USING

A MONTECATINI PRODUCT
. . . . . AVAILABLE IN
VARIOUS GRADES FOR ALL
APPLICATIONS . . . . . .
PROMPT DELIVERY FROM
STOCK IN U.S.A. & CANADA

CHEMORE CORPORATION
21 WEST STREET, NEW YORK 6, N. Y. TEL.: HA. 2-5275

No matter how you view it–
The practical choice is BLACK
...pigmented with

Practical people prefer smart jet black in many plastic products. Likewise, practical plastics manufacturers rely on Witco-Continental for uniform, color-constant carbon blacks for pigmenting.

Produced in 5 modern plants under strictest quality control, Witco-Continental channel and furnace blacks have long been noted for consistent, dependable performance.

WITCOBLAK® No. 11– low color channel
WITCOBLAK No. 32– maximum jetness at low cost
WITCOBLAK No. 50– good color and tinting strength
WITCOBLAK No. 100– jetter color, Nigrometer 74
WITCOBLAK HITONE– jet black, Nigrometer 71

Witco also offers a complete line of:

METALLIC STEARATES
STAYRITE® Stabilizers
WITCIZER® Plasticizers
WITCARB® Precipitated Calcium Carbonates

Write for complete technical data and samples. WITCO-CONTINENTAL Technical Service will be glad to assist you with your formulation problems.

WITCO CHEMICAL COMPANY
CONTINENTAL CARBON COMPANY

122 East 42nd Street, New York 17, N. Y.

Chicago • Boston • Akron-Cleveland • Atlanta • Houston • Amarillo • Los Angeles
San Francisco • London and Manchester, England

25 Years of Growth

steel producer. This follows an announcement that Mannesmann, another German firm, and largest European pipe producer, is building a huge pipe plant in British Columbia. Since Mannesmann is also building a 50 million-lb. low-pressure polyethylene plant in Germany in partnership with two other firms, there is likely to be speculation on the possibility that both these firms may have production of plastic pipe in mind on a grand scale at some future date.

EXPANSION

Durez Plastics Div., Hooker Electrochemical Co., has recently brought into production its new $5 million plant at Kenton, Ohio. The Kenton plant specializes in long uninterrupted runs of the largest volume compounds in Durez' line. This enables the main Durez plant at North Tonawanda, N. Y., to concentrate more intensively upon the manufacture of phenol and formaldehyde, the basic raw materials; on the manufacture of various phenolic resins; and on special molding compounds produced in smaller lots. The two-plant production setup thus provides faster and more flexible service for all Durez customers.

The North Tonawanda plant ships phenol and formaldehyde via either of two connecting railroads to Kenton, where the resin from which the compounds are formulated is also made.

Company buildings occupy 15 of the approximately 65 acres of land owned two miles south of the city of 9000 in western Ohio. Kenton was selected because it is in the geographical center of Durez' midwestern market and has adequate water and power.

Pittsburgh Coke & Chemical Co. will start construction of a $3 million plant for the production of phthalic anhydride, a basic raw material for the plastics and paint industries. The new plant, which will be located on Neville Island in the Ohio River below Pittsburgh, Pa., will double the phthalic anhydride capacity of the company's Coal Chemicals Div., and will be in production by the fall of 1956.

Pittsburgh's existing phthalic anhydride plant started operations in 1948. The new plant is a further step in the chemical phase of an expansion in which the company has invested $34 million since 1947.

Phillips Chemical Co., wholly owned subsidiary of **Phillips Petroleum Co.**, Bartlesville, Okla., has awarded a contract for the major portion of construction work on a 110-million-lb. per year plant to manufacture its new polyethylene, tradenamed Marlex, at the company's Adams Terminal chemical manufacturing site on the Houston Ship Channel.

The company also announces that construction will start at an early date on a Sales Service Laboratory at Bartlesville to provide complete facilities for adapting plastics to customers needs, with initial emphasis on Marlex.

Phillips had previously awarded a contract for construction of a 120-million-lb. per year plant to manufacture ethylene, the basic petroleum material for Marlex, adjacent to its refinery at Sweeny, Texas, south of Houston. Ethylene will be supplied to the Adams Terminal Marlex plant by a 75-mile connecting pipeline.

The Dow Chemical Co. has started construction of a new plant at its facilities in Torrance, Calif., for the manufacture of Styrofoam, an expanded polystyrene. The new facility, which is expected to be in production about January 1956, will supplement plants now producing Styrofoam in Midland, Mich., and at its Allyn's Point, Conn., Div.

Styrofoam 22 in white, red, and two shades of green and Styrofoam 33, the self-extinguishing type of material, will all be manufactured in the new facilities.

Dewey & Almy Chemical Co., Div. of W. R. Grace & Co., announces that construction of its new plant in Greenville, S. C., has been completed. The new facility, expected to begin production at the end of the year, will manufacture Cryovac bags for packaging meat, poultry, and cheese products. Part of the expansion program of the Cryovac Div. of Dewey & Almy, the Greenville unit will augment production of the Lockport, N. Y., and Cedar Rapids, Ia. plants, where facilities have recently been expanded and improved.

The new structure will have complete facilities for extruding, bag fabricating, and four-color printing. Between 300 and 400 persons will be employed at full production.

Monsanto Chemical Co. is increasing production and storage facilities at its plant in Everett, Mass., which is expected to be completed before the end of the year. The company reports that its production capacity for phthalate esters at the Everett plant will be increased probably 50% by January 1956.

In addition, 100,000 gal. of added storage capacity for muriatic acid is nearing completion at Everett, and work is also under way for 250,000 gal. of new storage capacity for the plant's output of plasticizers.

Monsanto claims to be the largest producer of phthalate esters in the United States, dividing its total output about equally between its Everett and St. Louis, Mo., plants.

Twenty-one different Monsanto plasticizers are currently produced at the Everett plant.

Columbia Mills, Inc., 420 So. Warren St., Syracuse, N. Y., announces that at a recent meeting of the board of directors several hundred thousand dollars had been appropriated for a plant expansion program. This is in addition to a somewhat similar amount appropriated for the same purpose earlier this year. A large part of this sum will go toward new equipment and modernization of facilities at the company's Minetto plant, where it manufactures plastic-coated fabrics.

International Molded Plastics of Puerto Rico has doubled its output since its inception only three months ago, according to **Joseph D. Fox**, one of the owners of the firm and plant manager. Six new molding presses have been installed in the plant which produces plastic dinnerware.

The firm employs 58 workers in a 23,000-sq. ft. factory constructed by the Puerto Rico Industrial Development Co. in Carolina, a small town

THE PLASTISCOPE

just outside of San Juan. The plant, which turns out a set of dishes every two minutes, is associated with **International Molded Plastics, Inc.**, Cleveland, Ohio. **George V. Goulder** is president of both companies.

Holiday Plastics, Inc., 410 E. 27th Terrace, Kansas City, Mo., has acquired **Thermacote Plastic Products Corp.**, Newark, N. J. As a result of the acquisition, Holiday will benefit from a $3 million contract received by Thermacote from Cinderella Glass Pool Co., a subsidiary of Paddock Pool Co., Los Angeles, Calif., for the manufacture of fibrous glass swimming pools.

Westchester Plastics, Inc., 326 Waverly Ave., Mamaroneck, N. Y., is expanding its production facilities and storage space by adding 3000 sq. ft. of manufacturing space to the recently completed 6000 sq. ft. of storage space.

The company states that increased sales of its "master batches" for thin polyethylene film, polyethylene molding powder, and other thermoplastic custom compounded materials necessitated the expansion.

Newark Die Co., Inc., 20-24 Scott St., Newark 2, N. J., has installed heavier milling equipment for production of larger molds. The company also announces that a second shift has been added to facilitate delivery of molds for the plastics industry and that additional floor space has been made available to meet the greater demands for plastic molds.

American-Marietta Co. has purchased **Stoner-Mudge, Inc.**, Pittsburgh, Pa., manufacturer of coating and lining for food and beverage cans. The acquisition was effected through an exchange of stock, valued in excess of $7 million.

COMPANY NOTES

Koppers Co., Inc., Pittsburgh 19, Pa., announces that **Dr. Paul W. Bachman**, well known for his research work with several of the nation's major chemical companies during the past 25 years, was elected vice president and director of Koppers' research. **Dr. E. W. Volkmann**, who has been manager of Koppers' Research Dept. since last February, continues in that position.

Under the new organizational set-up providing an over-all director of research and development as well as manager of the Research Dept., Dr. Bachman will be relieved of much administrative work and devote the majority of his time to spear-heading the development and commercialization of research-born products.

The company has also made the following changes in its Chemical Div.: **L. R. Hunter**, formerly Midwestern sales manager, has been named assistant manager of the Plastic Product Section; **Leo J. Diamond**, former Southern district sales manager, replaces Mr. Hunter in the Midwest; **Jones P. Sipe** succeeds Mr. Diamond in the Southern district sales office; and **G. E. Trent**, formerly administrative assistant, replaces Mr. Sipe in the Eastern district sales office.

The Goodyear Tire & Rubber Co., Inc., Akron 16, Ohio, announces the following personnel changes in its Films and Flooring Div.: **J. D. Long**, former films and flooring district manager in Cleveland, Ohio, and **A. F. Thomas**, who held the same position in Chicago, Ill., have been promoted to the new posts of Eastern and Western division managers, respectively. **K. J. Whisler**, formerly district manager in Dallas, Texas, has been assigned to the same post in Chicago; **C. E. Hixson**, formerly on the Pliofilm sales staff, has been made district manager in Dallas; and **K. L. Weeden**, previously manager of the Flooring Sales Dept., has been named district manager in Cleveland.

Pittsburgh Coke & Chemical Co., 2023 Grant Bldg., Pittsburgh 19, Pa., announces the formation of a Chemical Procurement Dept. to serve the requirements of the company's chemical divisions.

J. W. McNeill has been appointed manager of Chemical Procurement and **H. A. Carpenter** assistant manager. Mr. McNeill previously served with DuPont and since 1948 had been purchasing agent of the Marietta, Ohio, plant of B. F. Goodrich Co. Mr. Carpenter joined the company in 1948.

Pittsburgh Coke & Chemical also announces the appointment of **Homer Fry** as superintendent of production in its Coal Chemicals Div. He will be responsible for the overall production activities of the division's phthalic anhydride, plasticizer, sulphuric acid, phenol, and pyridine plants. Mr. Fry joined the company in 1948 and since 1952 has been supervisor of the division's phthalic anhydride plant on Neville Island. He has previously served with American Cyanamid Co. in a similar capacity.

Carbide and Carbon Chemicals Co., a Div. of Union Carbide and Carbon Corp., announces the following appointments in its Fine Chemicals Div.: **R. W. Eddy** and **J. J. Morris** have been named assistant managers. Both appointees will report to **W. A. Woodcock**, manager of Fine Chemicals. Mr. Eddy was formerly product manager directing market development of chemical intermediates, including acrolein and its derivatives and new chemicals from the company's new Oxo unit. Mr. Morris was previously product manager supervising market development of Flexol plasticizers and stabilizers for vinyl resins. **J. M. Cole** and **J. H. Mathewson** succeed Mr. Eddy and Mr. Morris as product managers and take over their respective duties. **George Trigaux**, who has been transferred from the company's South Charleston plant where he was area supervisor in charge of one of the production units, will assist Mr. Cole.

The Fine Chemicals Div. is responsible for the development of new products from "test tube" to "tank car."

Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y., announces that **G. T. Walker** and **E. Davis Caldwell** have been appointed to the sales staff of its newly formed Thermoplastic Resins Group. **H. A. Voskamp, Jr.** was recently named product sales manager of Plaskon thermoplastic resins. Mr. Walker was formerly with Midwest Molding & Mfg. Co. and prior to

Plastic parts for Ansco cameras are produced on this mold of Crucible CSM 2 by Sylvania Electric Products, Inc. The mold designer and builder was Alex Primas.

Intricate mold of

CRUCIBLE CSM 2

forms Ansco camera parts

This intricate six-cavity mold of Crucible CSM 2 mold steel produces small plastic parts for the flash holder of an Ansco camera.

It's an exacting molding operation, for the parts must be perfectly uniform and interchangeable. Success of the job depended upon a combination of excellent mold and part design, skilful mold building and mold operation and mold steel of the highest quality. That's why Crucible CSM 2 tool steel was chosen.

Whether your application requires a mold as complex as this one, or one of several tons, you can rely on Crucible. For Crucible mold steels are actually tool steels . . . produced in the country's foremost tool steel mill. So check with your Crucible representative. He can tell you how Crucible CSM 2 fits your job, and see that it's shipped *fast* from local stocks.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **MOLD STEELS**

CRUCIBLE STEEL COMPANY OF AMERICA · TOOL STEEL SALES · SYRACUSE, N. Y.

THE PLASTISCOPE

that he served with the former Plaskon Div. of Libbey-Owens-Ford Glass Co. Mr. Caldwell recently represented Barrett as a plastics specialist to the automotive industry in Detroit.

B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, Ohio, announces that **Thomas B. Nantz,** formerly plant manager of BFG Chemical's manufacturing operations at Calvert City, Ky., has been named general manager of plants. **Walter E. Brodine,** previously plant engineer at Calvert City and project engineer for an expansion at the company's Louisville, Ky., facilities, succeeds Mr. Nantz as plant manager at Calvert City.

Clint Royce, Inc., Milwaukee, Wis., has become affiliated with **Edgar Steiner Co., Inc.,** 45 Rockefeller Plaza, New York 20, N. Y., a 40-year-old research engineering firm. Steiner anticipates four or five different affiliations to increase its scope of operations and to tie in the company's knowledge of market potential with developing new supply sources for new products.

Mr. Royce is well known for his work with plastics in the packaging field. Included in his 25 years of experience are eight years as a specialist in packaging for the United States Navy. Mr. Royce will continue to maintain a Milwaukee office at 3727 N. Palmer St.

Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass., announces that **George J. Duffy** has been named general manager of its Minerals and Chemicals Div. He will supervise production and sales of Wollastonite, Cab-O-Sil, Alon, kaolin, plastic chemicals, industrial carbons, charcoal, and production of pine products. **Raymond P. Rossman** has been appointed director of research and development. He worked as research assistant in the Electrical Engineering Dept. of MIT before joining Cabot in 1937.

Irvington Div., Minnesota Mining & Mfg. Co., Irvington, N. J., has established a new Special Products Section which will handle the development and sales of all non-electrical products to the automotive, aviation, and general industrial fields. **John W. Apgar,** formerly assistant to the general manager of the Coating Div., has been promoted to manager of the new section.

National Vulcanized Fibre Co., Wilmington, Del., announces the formation of an Operating Board responsible for all management policies of the company.

Eugene R. Perry, president, is chairman of the Operating Board; **F. Irving Crow,** vice president and head of the company's administrative division, has become vice chairman. Members include: **Robert M. Gottschall,** company treasurer; **William M. Harbaugh,** manager of the Kennett plant; **Roy S. Fisher,** sales manager; **Howard H. Street,** manager of the Fiber and Paper Div.; **Gerald H. Mains,** director of research and development; **Gerard A. Albert,** manager of manufacturing; and **Henry C. Guhl,** manager of engineering.

W. H. Schaper Mfg. Co., Minneapolis, Minn., plastic game manufacturer, has purchased **Thunderbird Plastics, Inc.** (formerly known as Acme Plastics), 15 No. Second St., Minneapolis. Schaper will operate the acquired plant at its present location and will continue to offer a complete molding service of all forms of plastics, including both injection molding and vacuum forming.

W. H. Schaper, president of the game firm, will head the new company as president and treasurer. **Sheldon W. Sayles** has been named executive vice president and **Donald V. Bailey** secretary. **C. L. Barker,** owner of the former Acme Plastics, will continue as general manager of the Thunderbird firm.

Campco Div., Chicago Molded Products Corp., 2717 N. Normandy Ave., Chicago 35, Ill., announces that Australia will soon be producing Campco-type thermoplastic sheet and high gloss modified styrene under license from Campco Div. **Moldex, Ltd.,** Melbourne, Australia, will manufacture the sheet. Marketing of the material will be handled by **Mulford & Co. Pty. Ltd.** of Sidney and Melbourne. The company states that this was one of a number of foreign licenses now being negotiated throughout the world.

Monadnock Mills, San Leandro, Calif., has purchased **Plastic Process Co.,** 10400 Aviation Blvd., Los Angeles, manufacturer of plastics extrusions for the aviation industry. Plastic Process is also a producer of polyethylene and butyrate pipe and has recently started production of auto safety belts.

No change is planned in operation of the acquired firm. Top officials will be retained. **E. E. Kotkin,** president of Plastic Process, is now general manager under the new ownership. **Harry Wenk,** who was vice president of the company, becomes sales manager.

Monadnock Mills is a wholly owned subsidiary of **United Carr Fastener Corp.** Originally a New England firm, Monadnock now maintains its plant in San Leandro for the manufacture of aircraft fastening devices and metal stampings.

Baldwin-Lima-Hamilton Corp., Hamilton, Ohio, announces that **Theodore L. Theodorff** has been appointed district sales manager of the Detroit, Mich., office of the **Hamilton Press Div.** and **John Cameron** assistant chief engineer of **Hamilton Mechanical Presses,** Hamilton Div., at the home office. Mr. Theodorff has been associated with the company for the past 17 years in various supervisory capacities of press sales and service. Mr. Cameron was formerly with Clearing Machine Co., Chicago, Ill., where he served for 10 years in various engineering and sales engineering supervisory capacities.

The company states that the appointments were made as a continuance of its new policy of broadening B-L-H's present line of machinery to include virtually all types of mechanical presses from 100 tons and up.

U. S. Industrial Chemicals Co., Div. of National Distillers Products Corp., 99 Park Ave., New York 16, N. Y., announces that **John Lachmann** and **Kenneth E. Cosslett** have joined the company. Mr. Lachmann, who comes to U.S.I. from Chester Cable Corp., Chester, N. Y., will devote his initial efforts to sales service in the field of wire covering with

plastics. Mr. Cosslett, formerly with the Export Dept. of the Plastics Div. of Imperial Chemical Industries, Ltd., has been assigned to U.S.I.'s Export Dept.

Resin Research Laboratories, Inc., 406 Adams St., Newark 5, N. J., announces that **Jacques Benvenista**, **Arnold Gruben**, and **Harold Hudson** have been assigned to the Resin and Polymer Section and **Leonard Feiler** to the Coating Section.

Dewey & Almy Chemical Co., Div. of W. R. Grace & Co., Cambridge 40, Mass., announces the establishment of a new district office in Chicago, Ill., and the expansion of its organic chemical field sales force. **Charles E. Brookes** has been promoted to sales manager; **Tom C. Tarbox** as Eastern regional sales manager; and **John G. Broughton** as Midwestern regional sales manager.

Corrulux Div., L.O.F. Glass Fibers Co., P.O. Box 20026, Houston, Texas, expects to reach a 35% increase in sales during the next year. The company has recently announced a $250,000 expansion program which includes new type continuous production equipment for its fibrous glass panels.

Thomas O. McCullough, formerly with Gerity Michigan Corp., has been appointed general sales manager.

Seiberling Rubber Co., Newcomerstown, Ohio, has appointed the following sales representatives for its Plastics Div.: **Paine & Williams**, 4616 Prospect Ave., Cleveland, Ohio, will handle sales of the company's rigid Seilon in Ohio and Michigan; **The H. B. Strauss Co.**, 131 Water St., New York, N. Y., will handle Seilon formable materials in metropolitan New York, Long Island, and New Jersey.

The American Products International Exchange Co., P. O. Box 2224, Boston, Mass., has obtained a license to import injection molding machinery. In addition to selling the machinery, the company will service it, stock replacement parts, and offers a 24- to 48-hr. service.

Garfield Mfg. Co., Garfield, N. J., pioneer cold molding company, announces the following additions to its staff: **John P. Brecher**, formerly general manager of Nu-Bone Co., Erie, Pa., has been named plant en-

ADVANCE

POWER

STABILIZERS FOR RIGIDS

ADVASTAB 17-M (liquid) (organo-tin sulfur compound) Most powerful of organic stabilizers.

ADVASTAB 50 LT (organo-tin compound) Most effective organo-tin stabilizer with lowest toxicity of any tin stabilizer known at present.

ADVASTAB T-72 (non-mercaptide organo-tin compound) Powerful organo-tin stabilizer with very low toxicity. Gives minimum odor and irritating fumes during processing.

Non-tin Stabilizers also are available for rigid compounding

Advance makes a complete line of stabilizers for Rigids, Calendering and Extruding, Plastisols and Organosols. These products as well as Paint Driers, and Paint Specialty Chemicals (another industry where Advance is recognized as the pioneer source) are products of the Advance Research Laboratories — dedicated always to develop better and better

ADVANCE

Additive Chemicals for the Process Industries

Solvents and Chemical Corp.

245 Fifth Avenue, New York 16, N.Y.

THE PLASTISCOPE

gineer; **John Kusha**, previously with Tech Art Plastics, has been appointed superintendent of the Hot Molding Div.; and **Edmund A. Callahan**, formerly of Wright Aeronautics & Air Assoc., Teterboro, N. J., has been made supervisor of standards.

Detroit Mold Engineering Co., Detroit 12, Mich., producer of mold bases, retainer sets, and mold components, announces a price increase of about 10% on its products caused by the general increases in steel and labor costs.

Wallace Pencil Co., which claims to be the fifth largest producer of pencils in the United States, has opened a new division to be known as **Hanley Plastics Co.**, 2001 S. Hanley Rd., St. Louis 17, Mo. The new company will be engaged in the production of fibrous glass-reinforced polyesters for trade prototypes, small production items up to 500, and embedments for advertising specialties. Hanley Plastics will be completely independent of the pencil company.

Reichhold Chemicals, Inc., 525 N. Broadway, White Plains, N. Y., reports that **Ralph G. Mensch**, formerly sales manager of Acme Resin Corp., has been appointed district sales manager for specialty resins at the company's Argo, Ill., plant. He will specialize in sales of phenolic materials, particularly to the foundry and thermal-insulating industries. **Charles C. Spencer**, a specialist for nearly 10 years in technological development and sales of adhesives, paper coatings, and allied products, has joined the sales staff at the Argo plant. Mr. Spencer will work with the adhesive and paper industries on use of RCI's polyvinyl acetate emulsions.

L.O.F. Glass Fibers Co., Toledo, Ohio, announces the following appointments: **Don McAnally** has been named sales promotion manager of the company; **Edward A. McCabe** has been appointed district sales manager of the New York area; **Chester E. Shepperly**, district manager of the Boston, Mass., area; **James J. Secor, Jr.**, district sales manager of the Philadelphia Pa., area; **Francis W. McPeek**, district sales manager of the Cincinnati, Ohio, area. **G. O. Hartzell**, district manager of the Toledo area; and **Thomas D. Leather**, district manager of the Pittsburgh, Pa., area.

William Brand & Co., Inc., Willimantic, Conn., has appointed the following regional sales representatives: **Robert O. Whitesell & Associates**, 2208 E. Washington St., Indianapolis 1, Ind., will service Indiana and Kentucky; **W. E. Fry & Co., Inc.**, 406 W. 34th St., Kansas City 11, Mo., will cover Nebraska, Kansas, Iowa, southern Illinois, and western Missouri.

Bradley Container Corp. has moved its New York office to larger quarters at 655 Madison Ave., New York 21, N. Y. **E. W. Smith III** is sales manager in charge of the regional office.

Plastylite Corp., 333 North Dr., N. Plainfield, N. J., a phonograph record manufacturing plant doing custom pressing for various companies, is desirous of having the trade know that it is not to be confused with **Plastalite Corp.**, 27 E. 23rd St., Paterson, N. J., which has filed a petition of reorganization in the Federal Court in Newark N. J. Plastylite was incorporated in January 1946, the other firm in February 1954. Plastylite brought suit in court last August to restrain the new company from using the name Plastalite.

Joseph Davis Plastics Co., Arlington, N. J., has made the following appointments: President—**Morton Davis**; vice president—**Abraham Davis**; treasurer—**Lincoln A. Steinhardt**; chairman of the board—**Joseph Davis**; and secretary—**Mrs. Sadie Davis.**

Package Machinery Co. has moved its New York office to larger quarters at 420 Lexington Ave., New York, N. Y.

Duralastic Products Co., 2075 W. Lafayette Blvd., Detroit, Mich., announces that **Robert L. Bouse**, 510 Bethlehem Pike, Flowertown, Pa., has been appointed the company's custom molding representative in that state. **Cas Vorobik**, associated with A.I.M. Plastics Co., 408 Broad St., Seattle, Wash., has been named custom molding representative for the northwest.

Plastics Color Co., 233 Broad St., Summit, N. J., has appointed **Fiber Resin Supply Co.**, 1162 Eliott Ave., W., Seattle, Wash., as its sales representative to handle polyester resin paste colorants in Washington.

aaRBee Plastic Co., 4505 W. Jefferson Blvd., Los Angeles 16, Calif., has appointed **King & Anderson**, 1355 Market St., San Francisco 3, Calif., as its representative in San Francisco.

The Whitlock Co., manufacturer of vacuum forming machines, has moved to larger quarters at 4737 No. Ravenswood Ave., Chicago 40, Ill.

PERSONAL

Martin G. Gale has been named director of technical service of the Monomer Dept. of **The Borden Co.'s Chemical Div.** Mr. Gale, who has more than 10 years of experience in the formulation of adhesives, coatings, and impregnants, will head the division's technical service laboratory in Leominster, Mass. The laboratory offers technical advice and assistance to industrial users of polyvinyl alcohol, polyvinyl acetate, and other natural and synthetic resins manufactured by Borden's.

Gordon Cook, formerly sales manager of Acheson Dispersed Pigments Co., Philadelphia, Pa., has resigned and accepted a position with **Columbian Carbon Co.** as general manager of dispersions. The latter company expects to expand its business in carbon black dispersions for the paint, printing ink, and plastics industry.

David D. Jones was elected a vice president and director of **Extruded Plastics, Inc.**, Norwalk, Conn., and Marion, Ind.

Jack C. H. Stearns, has been advanced to the newly created office of executive vice president of **Dow Chemical International, Ltd.** and **Dow Chemical Inter-American, Ltd.**

Jack A. Fletcher has been named technical service representative for industrial chemicals of **Spencer Chemical Co.**, Kansas City, Mo., specializing in wire and cable in-

THE Columbia MILLS, Inc.

TAN-O-LITE

(vinyl coated fabric)

Tan-O-Tex

(pyroxylin coated fabric)

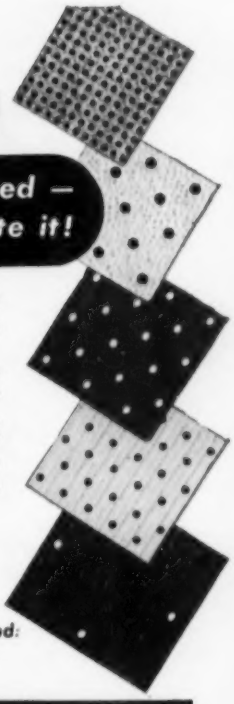
Handsome finishes, durable, flexible, scuff resistant, beautiful rich colors.

Columbia Mills is staffed with color experts and skilled technicians. Please consult us when faced with problems. Samples upon request.

Sales offices:
NEW YORK: 101 Park Avenue
BOSTON: 28 Main Street, Medford
CHICAGO: 320 West Ohio Street
SYRACUSE: 120 West Onondaga St

Plastics Perforated

If it can be perforated — H & K can perforate it!



Whether your problem is one of ventilation; escape of sound, fluids or air; or one of ornamentation — and requires one of the sheet or film plastics, or a plastic coated fabric — we offer you 70 years of perforating experience and "know-how," plus a large inventory of dies to provide an unlimited selection of hole sizes, shapes and spacings.

We invite you to send us your specifications for recommendations.

Write for booklet entitled: —— "Samples of H & K Perforated."

The Harrington & King Perforating Co

5656 Fillmore Street, Chicago 44, Illinois
114 Liberty Street, New York 6, New York

sulation. He has been engaged in wire and cable work with National Electric Products Co., Pittsburgh, Pa., for seven years.

Paul P. Philipson, formerly readers' service and directory editor of MODERN PLASTICS magazine, has joined **A. Bamberger Corp.,** 703 Bedford Ave., Brooklyn, N. Y., and will be engaged in sales and sales promotion.

George R. Waugh, Jr. has been named general manager of **Industrial Vinyls, Inc.,** manufacturer of custom vinyl extrusions. Mr. Waugh will be in charge of the recently established plant at 5511 N.W. 37th Ave., Miami, Fla.

John F. Ortner has been named assistant to **Frank C. Rowley,** sales manager of the Molding Compounds Dept., **Durez Plastics Div. of Hooker Electrochemical Co.,** North Tonawanda, N. Y. Mr. Ortner has been with Durez' New York City office for the past nine years.

Sam T. Page is now director of the Chemical Dept. of **Sam Tour & Co., Inc.,** 44 Trinity Place, New York 6, N. Y. During World War II, Mr. Page was associated with Stone & Webster and assisted in the planning of butylene, butadiene, and styrene plants for the United States Government.

Victor E. Buehrle, Jr. has been appointed technical sales representative of **The General Tire & Rubber Co.,** Akron, Ohio. He will represent the company on Gen-Tac latex and Glykon polyester resins.

F. William DeBree has been named general sales manager of **American Plastics Corp.,** 342 Madison Ave., New York 17, N. Y.

Almon G. Hovey has been appointed industrial scientist in charge of organic applications of **Olin Mathieson Chemical Corp.,** New Haven, Conn. His former affiliations were with Archer-Daniels-Midland Co. and General Mills, Inc.

Dr. Leonard Smidth has joined the High Polymer Section of **American Viscose Corp.'s Research and Development Div.** at Marcus Hook, Pa. He will work on problems pertaining to urea formaldehyde resins. Dr. Smidth was previously technical director at the New York headquarters of Sylvan Plastics, Inc., a wholly owned subsidiary of American Viscose, manufacturer of molding compositions at Fredericksburg, Va.

K. O. William Sandberg has been appointed manager of **General Electric Plastics** Dept.'s Decatur, Ill., custom molding plant.

Bruce F. Smith, manager of technical service of **Dow Corning Corp.'s** International Dept., has been transferred to the company's Canadian affiliate, **Dow Corning Silicones, Ltd.,** Toronto, Ont.

Harold E. Kehoe has been transferred to the West Coast office in Los Angeles, Calif., as sales and service engineer of **The Fellows Gear Shaper Co.'s Plastic Div.**

Roger B. Knowles, formerly assistant to the manager of the **Reinforced Plastics Div., Bigelow-Sanford Carpet Co., Inc.,** Amsterdam, N. Y., succeeds Charles R. LeConte as general manager of the division. Mr. Knowles was previously associated with American Insulator

...introduced us to profitable A. Bamberger's **reprocessed high-impact Polystyrene pellets!"**

It's easy to see why A. Bamberger is your best source of supply. A. Bamberger's reprocessed materials, in a complete selection including rugged high impact polystyrene, give you *guaranteed quality . . . yet cost you less!* These extra savings let you build extra sales . . . and extra profits! And now's the time to profit from that plastic scrap that's cluttering up your plant. We'll pay you top prices for surplus virgin inventory, off-color molding powder, obsolete parts, or what have you. Call our nearest office. Send samples, or let us inspect.

CELLULOSE ACETATE • BUTYRATE • POLYSTYRENE
POLYETHYLENE • METHYL METHACRYLATE • VINYL
ETHYL CELLULOSE • NYLON • ACRYLONITRILE • CRYSTAL
CLEAR PURGING COMPOUND FOR INJECTION MOLDERS
HIGH IMPACT POLYSTYRENE IN REPROCESSED PELLETS

A. BAMBERGER CORPORATION
PLASTICS MATERIALS

703 BEDFORD AVE., BROOKLYN 6, N. Y.

Phone: MAin 5-7450 • Cable: CHEMPROD BROOKLYN

CHICAGO OFFICE AND WAREHOUSE: 1750 WEST WRIGHTWOOD AVE. • *Tel. GRaceland 7-7420*
WEST COAST REPRESENTATIVE AND WAREHOUSE: RIVERDALE PLASTIC AND CHEMICAL CORP.
8510 WARNER DRIVE, CULVER CITY, CALIF. • *Tel. Texas 0-1000*

THE PLASTISCOPE

Corp.'s Reinforced Plastics Div. as general manager and with Owens-Corning Fiberglas Corp.'s Reinforced Plastics Div. as head of sales development for new products.

William T. Hack was elected president of **Snyder Chemical Corp.**, Bethel, Conn. He succeeds Ashworth N. Stull, who resigned to join American Resinous Chemicals Corp., Peabody, Mass.

Pat Harmon has joined **Presto Mfg. Co., Inc.**, 2 Franklin Ave., Brooklyn 11, N. Y., as sales manager. She will concentrate principally on the promotion of Gai-Foam, a vinyl foam manufactured by **Great American Industries, Inc.**, Bedford, Va., and fabricated and offered to the trade by Presto.

Douglas L. Cochran has been appointed vice president in charge of sales of **Resin Industries, Inc.**, Santa Barbara, Calif., manufacturer of vinyl insulation sleeving and tubing for the aircraft, electronics, and pharmaceutical industries.

Richard O. Thomas has joined the Pioneering Research Group of **Atlantic Research Corp.**, Alexandria, Va. Mr. Thomas was formerly a research analyst at the National Academy of Sciences.

MEETINGS

Plastics Groups

Nov. 9—Society of Plastics Engineers, Inc., Meeting, Military Park Hotel, Newark, N. J. Herbert O. Corbett, Chief Engineer of Extrusion, Auburn Button Works, Inc., Will Address the Newark Section on "Sheet Extrusion." W. J. Connelly, Bakelite Co., Will Show a Movie on the "Molding of Phenolic."

Nov. 16—Society of Plastics Engineers, Inc., Atlantic Region Conference and Technical Symposium, Hotel Statler, New York, N. Y.

Dec. 6-7—The Society of the Plastics Industry, Inc., Sixth S.P.I. Film, Sheeting and Coated Fabrics Division Conferences, Hotel Commodore, New York, N. Y.

Feb. 7-9, 1956—The Society of the Plastics Industry, Inc., Eleventh An-

nual S.P.I. Reinforced Plastics Division Conference, Hotel Chalfonte-Haddon Hall, Atlantic City, N. J.

March 8-9—The Society of the Plastics Industry Canada, Inc., Fourteenth Annual S.P.I. Canadian Conference, Sheraton-Brock Hotel, Niagara Falls, Ontario, Canada.

March 27—The Society of the Plastics Industry, Inc., Pacific Coast Section, Annual Meeting, San Francisco. Other meeting Aboard Ship, March 28 to April 2.

June 11-15—The Society of the Plastics Industry, Inc., Seventh National Plastics Exposition, New Coliseum, New York, N. Y.

Other Meetings

Nov. 8-10—Packaging Association of Canada, Fourth Canadian National Packaging Exposition and Banquet, C.N.E. Automotive Bldg., Toronto, Ont.

Nov. 14-15—The Chemical Market Research Association and Commercial Chemical Development Association, Joint Meeting, Hotel Carter, Cleveland, Ohio. Subject: "Chemical Fibers."

Nov. 14-15—TAPPI National Plastics Meeting, Brooklyn Law School, Brooklyn, N. Y. Theme: "Fibers and Plastics for Laminates."

Nov. 16-18—Society for Experimental Stress Analysis, Annual Meeting, Hotel Sheraton, Chicago, Ill.

Nov. 27-30—American Chemical Society, Ninth National Chemical Exposition, Public Auditorium, Cleveland, Ohio.

Nov. 27-30—American Institute of Chemical Engineers, Annual Meeting, Statler Hotel, Detroit, Mich.

Dec. 5-9—International Exposition Co., New York, N. Y., Twenty-fifth Exposition of Chemical Industries, Commercial Museum and Convention Hall, Philadelphia, Pa.

Dec. 6-8—Signal Corps Engineering Laboratories and the Wire and Cable Industry, Fourth Annual Symposium on "Technical Progress in Communication Wire and Cables," Berkeley-Carteret Hotel, Asbury Park, N. J.

Feb. 22-March 2, 1956—British Industrial Fair Ltd., British Fair, Earls Court, London, England.

"Everybody wants to be first to tell the boss about new low-priced AMPACET® Confetti Tinsel C/A."

Competitive markets become a soft touch for products made of AmpAcet's new low-priced Confetti Tinsel Cellulose Acetate. Quality-wise and price-wise buyers agree there's nothing like it for smarter, better-selling novelties, sunglass frames, buttons, and toys. Write for a sample . . . and see for yourself. And don't overlook those other sales-building, prestige-building AmpAcet products—AmpAcet molding powders for all-purpose use . . . AmpAcet Polystyrene mother of pearl for wall tile, cosmetic packaging, jewelry boxes, and other high-fashion uses . . . AmpAcet Polystyrene Confetti Tinsels . . . and a complete line of Pearls, Tinsels, Phosphorescents, and Iridescents — to meet your every need. Samples on request — or send us your sales problem . . . we'll be glad to recommend a profitable solution.

YOUR **NEW SOURCE** OF SUPPLY FOR **NYLON 6** (CAPROLACTAM)

Write for specifications and details

AMERICAN MOLDING POWDER AND CHEMICAL CORPORATION

703 BEDFORD AVE., BROOKLYN 6, N. Y.

Phone: MAin 5-7450 • Cable: CHEMPROD BROOKLYN

CHICAGO OFFICE AND WAREHOUSE: 1750 WEST WRIGHTWOOD AVE. • Tel. GRaceland 7-7420
WEST COAST REPRESENTATIVE AND WAREHOUSE: RIVERDALE PLASTIC AND CHEMICAL CORP. 8510 WARNER DRIVE, CULVER CITY, CALIF. • Tel. Texas 0-1000

CLASSIFIED ADVERTISEMENTS

MODERN PLASTICS reserves the right to accept, reject or censor classified copy.

EMPLOYMENT • BUSINESS OPPORTUNITIES • EQUIPMENT (used or resale only)

MACHINERY and EQUIPMENT FOR SALE

FOR SALE: 3—National 10"x20", 6"x14" Two Roll Mills; 3—Baker Perkins 100 gal., 50 gal. jacketed double arm Mixers; 2—Stokes Rotary Preform Presses DDS 2, D3; 3—Stokes Model "R" single punch Preform Press; 1—Kux Model 15-25 double action Rotary Press; 2—Cumberland #0 Rotary Cutters; Also: Sifters, Cutters, Banbury Mixers, etc., partial listing; write for details; we purchase your surplus equipment. BRILL EQUIPMENT CO., 2407 Third Ave., New York 51, N. Y.

FOR SALE: Injection Molding Machines, 22 oz. IMPCO, 16 oz. H.P.M. Late type machines, 9 oz. H.P.M., 8 oz. W. & S., 4 oz. De Mattia, 1 oz. Sav-Way. Mod. 252 Stokes closure press, Ball & Jewell plastic grinders. AARON MACHINERY CO., INC., 45 Crosby Street, New York 12, N. Y.

BANBURY Size B Lab Mixer. Thropp 3"x8" Lab Mill. Stokes 150 ton semi-autom. hydr. Press. Kux 2½" dia. single punch Preform Machine. Loominster 8 oz. Injection Molding Machine. Farrell 15"x36" 2 roll Mill. Mills and Calenders up to 84". New Seco 6"x12" and 6"x16" Lab. Mixing Mills and Calenders. Plastic & Rubber Extruders. Brunswick 200 ton 21"x21" platens. Bolling 150 ton 20"x20" platens. French Oil 8 opening 315 ton 42"x42", Wat.-Stillman 75 ton automatic Molding Press 20"x20" platens. 200 ton Hobbing Press 18"x14" platens. HPM 200 ton 30"x49" platens. New Loomis 340 ton, 24"x56" platens. Robertson 150 ton, 24"x24" platens. Adamson 100 ton, 20"x20" platens. Farrel 200 ton 20"x50" platens. Southwark 30 ton 14"x14" platens, semi-auto. Also Lab to 2000 tons from 12"x12" to 48"x48". Hydr. Oil Pumps. Gould 75 HP motor Dr. 2 stage Centrif. Pump 250#. W.S. 4 Pigr. High and Low Pressure Hydr. Pump. Elmes Hor. 4 Pigr. 4500 lbs. and 5500 lbs. Hydr. Pumps, Accumulators. Stokes Automatic Molding Presses. Rotary & single Punch Preform Machines ½" to 4". Injection Molding Machines 1 oz. to 60 oz. Baker Perkins Jacketed Mixers. Plastic Grinders. Heavy duty mixers, gas boilers. Partial listing. We buy your surplus machinery. STEIN EQUIPMENT CO., 107 8th Street, Brooklyn 15, N. Y. STerling 8-1944.

FOR SALE: Stainless Steel Rotary Dryer, Link Belt Co., 5'2"x16". No. 502-16, with all auxiliary equipment. Roto louvre also 6'x24' and 5'x26'. Hersey Stainless Steel Rotary Driers. Reply Box 2013, Modern Plastics.

SAVE WITH GUARANTEED REBUILT EQUIPMENT: HYDRAULIC PRESSES: compression molding Dunning & Boschert 3—12" ram 170 ton, 2—10" rams 113 ton—Baldwin Southwark 4—36"x26" 8" ram, 75 tons; 5—26" x26" 7" ram 57.7 tons; 5—15"x15" 8" ram, 75 tons; 4—14"x14" 8" ram, 75 tons; 2—19"x24" 10" ram, 75 tons; 18"x18" 7" ram, 57.7 tons; 3—12"x12" 7½" ram, 66 tons; 8"x9" 4½" ram, 20 tons; D&B 12"x12" 3" ram, 10 tons: LABORATORY PRESSES: Carver 6"x6" 10 ton, W&S 6"x6" 20 tons; Preform Presses 5½T Colton and Stokes R, M.D.: NEW UNIVERSAL DUAL PUMPING UNITS, 3-15 HP; NEW LABORATORY MILLS AND CALENDERS, also extruders, mixers, vulcanizers, injection molding units, etc. UNIVERSAL HYDRAULIC MACHINERY CO. INC., 285 Hudson Street, New York 13, N. Y.

FOR SALE: Embossing Machine for Plastic film, light or heavy gauge. Will Emboss, laminate & polish 8 preheating rolls, electric controlled, Teflon covered, 64" face, with dual let off and dual friction clutch take up, air guides & baloney roll. Can be seen in operation. T & M MACHINE & TOOL CO., 15-17 Greenpoint Ave., Brooklyn 22. New York, Tel.: EV 9-1944.

FOR SALE: (2) 300 Ton W.S. Presses 20x20 & 28x24 Platens. 140 Ton W.S. 22x16 Platen. 85 Ton Waterbury Farrel 20x24 Platen. 63 Ton Press 15x15 Platen with Pullback Cyls. 9, 8, 4, Oz. injection Molding Machines. 15 Ton Lab. Presses 10x8 Platen. 10 Ton Lab. Presses 6x6 Platen Ball & Jewell Plastic Grinders. Standard Mystic Embossing Presses, Accumulators, Pumps, Valves. Many other Presses—Send For Bulletin. No. 252 Stokes Closure Press, 700 Ton National Erie 38x38 platens, 250 Ton W&S 28x24 Platens, 113 Ton Farrel 36x36 Platens, 80 Ton Farrel 24x24 Platens. AARON MACHINERY CO., INC., 45 Crosby St., New York 12, N.Y. Tel.: WAlker 5-8300.

FOR SALE: Sheridan Press, type 9 AH Hydraulic head 26" x 54" in excellent working order with or without automatic feed and windup. Can be seen in operation here at plant. Purchased new by present owner from Sheridan and worked small number of hours at very low pressures and temperatures. ALLIED CHEMICAL COATINGS, INC., East Lynn, Mass.

INJECTION MOLDING MACHINES: 3—12 oz. Lesters and 1—4 oz. Lester, 4—3 oz. Fellows, 1—12 oz. Impco, 1—22 oz. Reed Prentice. Can be seen running in our plant. Reply Box 2026, Modern Plastics.

FOR SALE: 2—880 ton self-contained compression molding presses; 1 National Erie 8½" strainer; 1 R. D. Wood 30 ton self-contained laboratory press; 1 Colton 5½T preform press, 3" dia. tablet; 1 NRM 1" electric bench model extruder; also mills, mixers, extruders, etc. CHEMICAL & PROCESS MACHY. CORP., 146-148 Grand St., New York, N. Y.

FOR SALE: Heavy Duty Double Arm Sigma Blade Mixers. (4) Readco 50 gal. 30 HP; (2) W & P 100 gal; (1) Day 30 gal. (2) Kux Rotary Pellet Presses. (4) Sprout-Waldron Horizontal Ribbon Mixers 336 cu. ft. (12,000#) capacity. (1) 1300 gal. T316 St. Kettle, jacketed 25# atmospheric internal paddle agitator. PERRY EQUIP. CORP., 1429 N. 6th St., Phila. 22, Pa.

FOR SALE: 200T H.P.M. Fiberglass press 84" x60" pl. Williams & Turner Preformers.—Injection Presses: 4, 8, 12, 24 oz. Reeds. 2, 9 oz. H.P.M. 32 oz. Vertical H.P.M. 8, 12, 20 oz. Lester. 12 oz. Watson. 1, 2 oz. Van Dorn. 4 oz. Lewis (Makray). Extruder: Stokes-Windsor RC 65 Twin-Screw. Cumberland 6 & 1 scrapgrinders. —Ovens. Merid. Temp. Circulator.—6"x12" Lab. Mill. Compression Presses: 50 to 600 tons. 50T & 150T. Stokes Standard Presses. 15T. Stokes Automatics. Preforming Presses: Stokes No. 294 & Kux No. 60.—30 HP Gasboiler. AUTO-VAC Vac. Forming mach. 52"x30". 200T. Hobbingpress. List your Surplus Equipment with me. All Midwest locations. JUSTIN ZENNER, 823 Waveland Ave., Chicago 13, Ill.

FOR SALE: (11) 75 ton record presses, complete @ $2,450, (11) new 100 ton, 10" ram, 10" stroke @ $1,100, (8) 200 ton, 9" stroke, 14" ram, 36x36 @ $1,850, (7) 200 ton, 9" stroke, 15" ram, 30x30 @ $1,650, (1) 50 ton complete, 18x18 @ $1,850, (1) 200 ton, 16" ram, 30x30 @ $2,450, (2) 200 ton, 16" ram, 42x42 @ $2,850, (1) 200 ton, 15" ram, 42x42 @ $2,450, (4) 250 ton, (2) 12" rams, 36x60 rebuilt @ $3,375. HYDRAULIC SAL-PRESS CO., INC., 388 Warren Street, B'klyn, N. Y.

FOR SALE
Nearly new 2 oz. molding machine. 2 oz. HY-MAC model IM-Z injection molding machine, new in 1947-48 very little use. Clearance of 12½", takes dies of 5½" (min) to 9½" (max). Maximum pressure 28,400 PSI, injection stroke 3 sec cycle for 8" at 100 FPM. Has metering device, timers, controllers and safety devices.
MILES MACHINERY CO.
2025 E. Genesee Ave., Saginaw, Michigan
Phone 2-3105

FOR SALE: Injection Molding Machine, two ounce, H.P.M. Contact C. F. SKALIC, 4117 W. Marquette Road, Chicago 29, Illinois.

FOR SALE: One Niles Goodman sheeter, model 27, in excellent condition, capacity up to 43" rolls, $1300.00. One Hobbs 50" power shear in excellent condition, used approximately one year, $2400.00. One 500 ton Davidson Kennedy press in good condition, 22"x22" bed, 20" daylight, $1200.00. Write ROBERT K. PRICE COMPANY, Fayetteville, Georgia.

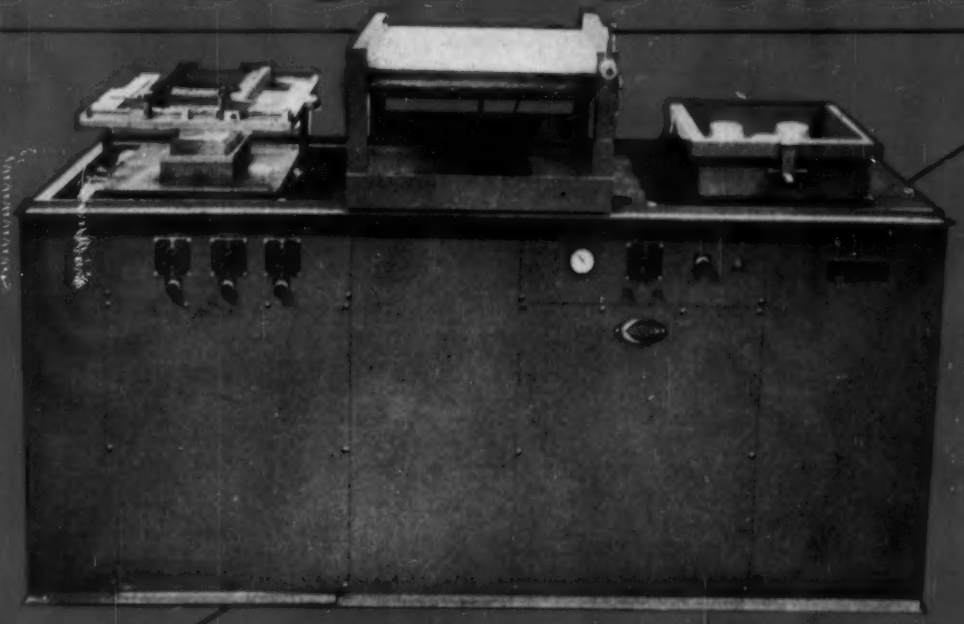
FOR SALE: INJECTION MACHINES: Impco VF-822 and VF-822A, 350 Tons Clamp, HPM Model 200-H-9, 9 oz., 200 Tons Clamp. HPM Model 350-H-16, 16 oz., 350 Tons Clamp. Reed-Prentice 12 oz., 1952 Machine. Reed-Prentice and Watson-Stillman 2 oz. Van Dorn Model H-200, 1 oz. (2) EXTRUDERS: 6" Royle #4, 6" Allen-Williams "Rapido." 3½" Hartig, 2" Royle #1, All Individual Motor Drive. HYDRAULIC PRESSES: Elmes 1000 Ton Hobbing Press, MD Pump. Baldwin-Southwark 3600 Ton Belt Press. HPM 750 Ton, Self-Contained. Lake Erie 215 Ton Self-Contained. Semi-Automatic. Watson-Stillman and HPM 100 Ton, Burroughs 75 Ton Electrically Heated, HPM 35 Ton Molding Presses. Watson-Stillman and Elmes 30 and 20 Ton Lab Presses. Stokes Model 200D-3 and Model 235 Automatic and 200 Ton, 150 Ton and 100 Ton Semi-Automatic Presses. TABLET MACHINES: Stokes S-5, R, T and RDS-3 and Colton #5 and #5½. SCRAP CUTTERS: Ball & Jewell Stainless Steel, 1 HP Motor. Cumberland #O, 2 HP. MILLS: 1—Eemco 20"x22"x60", 200 HP Motor and Speed Reducer. 4—Farrell 18"x50", 250 HP Speed Reducer. Available as a Mill Line or Individual Units. 4—Farrell 16"x40", 150 HP Motor and Speed Reducer. MIXERS: Banbury #1, Completely Chrome Plated Interior for Plastics, 50 HP Motor Drive Oil Heating System. All Controls. Baker-Perkins, Jacketed, 2¼ Gallons, Gear-Motor Drive. MISCELLANEOUS: Vulcanizers, Calenders, Grinders, Pumps, Valves, Platens, Etc. JOHNSON MACHINERY COMPANY, 683M Frelinghuysen Avenue, Newark 5, New Jersey. Bigelow 8-2500. WHAT HAVE YOU FOR SALE? WHAT ARE YOU LOOKING FOR?

FOR SALE: 1—Royle #4 Extruder, motor driven; 1—6"x12" Laboratory Mill, m.d.; 1—Ball & Jewell Rotary Cutter, size O m.d.; 2—Baker-Perkins Size 15, 100 gal. Jacketed Mixers; 5—Horizontal Dry Powder ribbon Mixers, 4000#, 1500#, 500#; 1—New 3 Roll 6"x16" Laboratory Calender; 1—Farrell-Birmingham 60" Mill with reduction drive, 150 HP motor, floor level mounting; 1—Fitzpatrick "D" Comminutor, S.S. contact parts, jacketed; 1—Mikro Pulverizer #2th, with motor; 4—Reed Prentice & W-S Injection Molding Machines, 2-16 oz.; Also other sizes: Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters. Send us your inquiries. What have you for sale? CONSOLIDATED PRODUCTS CO., INC., 50 Bloomfield Street, Hoboken, N.J. HOboken 3-4425, N.Y. Tel.: BArclay 7-0600.

AVAILABLE AT BARGAIN PRICES
Mitts & Merrill 15 CD Rotary Cutter. J. H. Day, from ¾ up to 100 gal., Imperial and Cincinnatus D. A. Jacketed, Sigma Blade Mixers. Day 15 to 10,000 lbs. Dry Powder Mixers. Baker Perkins Heavy Duty (Steam Jacketed) Double Arm, from 5 to 200 gal., Mixers (Unidor and Vacuum also). Gemco 2000 lbs. 56 cu. ft. Double Cone Blender. Mikro Bantam, 18H, 1F, 2TH Pulverizers. Day, Rotex, Tyler Hum-mer, Robinson, Raymond, Gayco, Great Western Sifters. Colton 2RP and 3RP Rotary Tablet Machines. Carver Laboratory 20 ton hydraulic Press. Package Machy. FA, FA2, FA4, Miller, Hayssen, Wrap-King, Scandia, Hudson Sharp, Oliver Auto. Wrappers—all sizes. This is only a partial list. Over 5000 machines in stock available for immediate delivery. Tells us your machinery requirements.
UNION STANDARD EQUIPMENT CO.
318-322 Lafayete St.
New York 12, N. Y.

(*Continued on page 282*)

VACFORM



This machine produces ideas

It's big news for you that VacForm introduced its sensational new Model 88 for $975 . . . the first machine priced under $1000 with actual-production techniques similar to big vacuum forming presses . . . making it easy and economical for you to explore the potentials of starting or expanding vacuum forming operations . . . with low-cost pilot runs and experimentation on new ideas, rapid development and market testing of new items and new designs

It's even bigger news now that VacForm also offers the remarkable Model 88-FM, adding a convenient drape forming attachment, at a total cost of only $1500 . . . making possible simultaneous vacuum and drape forming, using a single efficient heater . . . adding faster "two way" production by one operator to all the other advantages of this equipment . . .

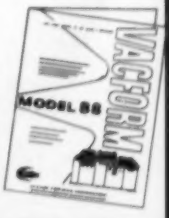
- **Economy**—Low initial investment and no maintenance problems; fully guaranteed construction
- **Versatility**—Drape or vacuum forming of accurately detailed products, parts, packages, and displays from all types of thermoplastics, including new "wonder" materials
- **Speed**—Machine set-up within a few minutes, using rapidly obtained, inexpensive male or female molds
- **Convenience**—Minimum floor space required; equipment has foolproof controls for safe, easy operation by personnel without special skills or previous training.

The VacForm Model 88 is a "machine with a mission"—to help put you ahead of competition and keep you ahead.

VACFORM

Foreign Sales Representatives:
In Canada—
F. F. BARBER MACHINERY DIV.
Massey-Harris-Ferguson Ltd.
187-191 Fleet Street W., Toronto
Worldwide: OMNI PRODUCTS CORP.
460 Fourth Avenue, New York 16, N. Y.
Correspondents Throughout the World

GET THE FACTS NOW without cost or obligation. Write wire, or phone today for a VacForm Model 88 demonstration or for your copy of this informative illustrative folder.



VACUUM FORMING CORP.

PORT WASHINGTON, LONG ISLAND, N. Y. • Tel.: POrt Washington 7-7272

CLASSIFIED ADVERTISING

(*Continued from page 280*)

FOR SALE: (6) 4 oz. Lesters, 1953, fully automatic, $55,000; large machines, 32 to 40 ozs.; 24 oz. Reed-Prentice, 1950, $17,500; 22 oz. Impco w/transfer plunger; 16 oz. H.P.M., $9,000; 16 oz. Watson-Stillman, $9,000; 12 oz. Impco vert., $8,000; 12 oz. DeMattia, 1952, $10,500; 12 oz. Reed-Prentice, 1952, $14,500; 12 oz. Lester, $7,500; 9 oz. H.P.M., 1946, $5,500; 9 oz. H.P.M., 1943, $4,000; 8 oz. Reed-Prentice, 1946, $6,500; 8 oz. Reed-Prentice, 1948, w/plunger advance, $7,500; 8 oz. Lester, 1950, $7,750; 6 oz. Lester, Model 1½ L; 6 oz. Hisgen, $1,850; 4 oz. Impcos w/larger cyl., $5,500; 4 oz. Lewis, 1953, $5,000; 4 oz. Lester Vert., $4,500; 12 oz. Lester Model L2½, $11,-000; 4 oz. Lester, $3250; 3 oz. Fellows, $6500; 3" Hartig extruder, oil heated, $1250; 2 oz. Moslos, 1954; Stokes presses, compression, transfer & preform; all types plastic equipment. ACME 102 Grove Street, Worcester, Mass. Tel.: PL 7-7747.

FOR SALE: Johnson #122 & #126 Cap Lining Machines, Complete, Perfect Condition, Used on Molded Closures. Reply Box 2033, Modern Plastics.

BUTTONDEX MACHINES: Slightly used machines for sale at bargain prices. Reply Box 2012, Modern Plastics.

VACUUM FORMING MACHINE: Complete with water cooling pistons, vacuum pump, motors, etc. Arranged for automatic cycle operation, also manual operation. New equipment—never used, original shipping skids—cost $11,986.00. Model 72-42 Serial #N-106 built by Vacuum Forming Corporation of Port Washington, New York. To save money address THE PLASTEX COMPANY, Columbus 3, Ohio.

MACHINERY and EQUIPMENT WANTED

WANTED TO PURCHASE: One Thermal No. 15 Preheater or Equivalent. Minimum 1½ KW Required. Reply Box 2034, Modern Plastics.

PLASTIC DRYING OVEN WANTED
Tray type, circulating air, electrically heated. At least 100 lb. per hr. capacity. Reply Box 2036, Modern Plastics.

WANTED: Resin Kettles, stainless steel or glass lined, from pilot plant up to 2000 gal. sizes. Also Rotary Pellet Presses; B & J cutters; Mikro Pulverizers; etc. Send us your list of surplus equipment. PERRY EQUIPMENT CORP., 1429 N. 6th St., Phila. 22, Pa.

MATERIALS FOR SALE

FOR SALE: 20,000 lbs. each Red and Blue Styrene Pellets. Surplus lot Red Acetate Pellets—15,000 lbs. Both attractively priced. We are also in the market for all surplus plastic scrap and powder. PLASTIC MOLDING POWDERS, INC., 2004 MacDonald Avenue, Bklyn., N. Y. Tel.: ES 5-7943.

FOR SALE
10,000 lbs. Bright Red Virgin Tenite I.
10,000 lbs. Bright Blue Virgin Tenite I.
5,000 lbs. Virgin Dow 475 Chartreuse.
15,000 lbs. Red Reprocessed Polystyrene High Impact. 8,000 lbs. Green and Blue Reprocessed Polystyrene High Impact. 10,-000 lbs. Yellow Reprocessed Polystyrene High Impact. 10,000 lbs. each, Red, Green, Yellow Reprocessed Polystyrene, 18,000 lbs. Natural A-1 Reprocessed Polyethylene. 30,-000 lbs. Reprocessed Black Polyethylene. 50,000 lbs. Transparent Red Methyl Methacrylate taillight formulation. Samples and prices on request.
A. BAMBERGER CORPORATION,
703 Bedford Ave., Brooklyn 6, N. Y.
Telephone MAin 5-7450

FOR SALE
250,000 Cellulose Acetate Identification or Photo Holders, 3"x5", Open At End. 15 Tons Amberol #226. 5 Tons Tricresyl Phosphate. 1 Ton Isobutyl Methacrylate Polymer. 10 Tons Dimethyl Phthalate. 1 Ton Cerex. CHEMICAL SERVICE CORP., 96-04 Beaver St., New York 5.

FOR SALE: 1 ton Ebonite powder for disposal. Samples available on request. RIST'S WIRES & CABLES LTD., Lower Milehouse Lane, Newcastle, Staffs, England.

MATERIALS WANTED

CLEAR ACRYLIC MOLDING POWDER SCRAP wanted by end user either reground or unground. Also nylon molding powder scrap needed. Highest cash prices paid. Reply Box 2011, Modern Plastics.

WANTED: PLASTIC SCRAP. Polyethylene, Polystyrene, Acetate, Acrylic, Butyrate, Nylon, Vinyl. GEORGE WOLOCH, INC., 661 West 26th Street, New York 1, N. Y.

PLASTIC SCRAP WANTED: All types and grades, Polystyrene, Acrylic, Acetate, Butyrate, etc. Interested in both large and small accumulations. Send us a description and small representative sample, and we will quote promptly. SUCCESS PLASTICS RECOVERY WORKS, INC. P. O. Box 506, 7200 Pendleton Pike, Indianapolis, Ind., or Telephone Liberty 6-2919.

WANTED: Plastics Scrap and Rejects of all kinds, ground and unground. Also rejected molded pieces and surplus virgin molding powders. Top prices paid.
A. BAMBERGER CORPORATION
703 Bedford Ave., Brooklyn 6, N. Y.
MAin 5-7450

SCRAP PLASTICS: All forms, waste and surplus plastic molding materials, rejects in any form. We will also buy your obsolete inventories of molding powders, stabilizers, plasticisers and other plastic and chemical materials. ACETO CHEMICAL CO., INC., 40-40A Lawrence St., Flushing 54, N. Y. INdependence 1-4100.

WANTED: Plexiglas and Lucite scrap, salvage and cut-offs, any quantity. DUKE PLASTICS CORP., 584 Broadway, Brooklyn 6, N. Y. Tel.: EVergreen 8-5520. Note new address!

MOLDS FOR SALE

FOR SALE OR EXPORT: Metal drape and vacuum forming shell molds of Xmas items for illuminated displays. Santas (all sizes), sleighs, candles, angels, reindeer, candy canes, bells, etc. All for half of original cost. Also many other molds in stock for novelties, etc. Reply Box 2010, Modern Plastics.

FOR SALE: Used Steel Molds in good condition for Baby and Girl Dolls 4", 5", 12", 16". Send request for samples and prices to Box 2040, Modern Plastics.

MOLDS WANTED

WANTED TO BUY: Molds for Plastic Waste Baskets, Garbage Buckets, Mats and Housewares. Give item size, mold size, machine size, and price in first letter. Reply Box 2024, Modern Plastics.

PLANTS FOR SALE

FOR SALE: New Swedish machinery complete for an up to date Wood Flour mill together with design and detail instructions. Prompt delivery. Sweden belongs to the leading wood flour manufacturing countries and the strict regulations stipulated by the Swedish authorities have forced our engineers to produce absolute safety proof constructions of highest class. Please write AB LINEX, Riddargatan 45, Stockholm, Sweden.

FOR SALE OR RENT in Small Northwestern Connecticut Town. 10,000 Square Foot Mill (Brick Construction). Untouched by Recent Floods. Plenty of Labor in the Village. Write: LOCAL INDUSTRIES, INC., Lakeville, Conn.

HELP WANTED

MARKETING MEN for Plastic Molding compounds, Plastic Sheeting, Plastic Film and Vinyl Resins. Opportunity for outstanding men, age 27 to 42, with technical degrees or backgrounds to become a part of the rapidly expanding plastics industry. Experience in industrial selling or product development would be helpful. Stimulating work with a future for candidates with a strong sales personality, the ability to work with minimum supervision and possessing initiative and imagination. Send resume giving complete details including salary required. Reply Box 2005, Modern Plastics.

PLASTICS ENGINEER: Must be heavily experienced and trained in injection molding work. Must be able to completely engineer custom molding jobs from the proper mold design to the necessary fixtures and work lay-outs for all types of finishing operations including assembly, spray-painting, hot stamping, buffing, and other secondary operations associated with a complete custom injection molding service. Should also be familiar with estimating and mold follow-up. Ours is a large and modern plant. This is a rare opportunity to become associated with an expanding firm. Reply Box 2043, Modern Plastics.

PLASTIC SALES ENGINEER: We are seeking a well qualified man experienced in plastics extrusion for attractive Market Development position. Kindly give your education, experience, and expected salary in complete resume. All replies will receive careful attention and will be held confidential. Write: 108 Personnel Department, Chemical Division, KOPPERS COMPANY, Pittsburgh 19, Pa.

EXTRUSION SUPERVISOR
Thoroughly familiar with die design, set up, and running intricate shapes wanted by leading Eastern custom-extrusion house. Congenial working conditions. Company will help relocate right man. Enquiries will be treated in utmost confidence. Reply President, Box 2027, Modern Plastics.

ESTABLISHED New England plastics products manufacturer needs extrusion man to blend and color and plasticize polyethylene and styrene. Top pay to right man. Reply Box 2020, Modern Plastics.

POLYMER CHEMIST WANTED
Experienced Polymer Chemist required for fast growing midwest firm. Excellent opportunities. Replies treated confidentially. Reply Box 2002, Modern Plastics.

GRADUATE ENGINEER
Graduate Engineer experienced in the design, formation and fabrication of reinforced plastics offered outstanding career opportunity with Boeing Airplane Company. The development of parts for the rapidly expanding manufacture of aircraft presents interesting and varied challenges. Send complete resume of qualifications and experience to John C. Sanders, Staff Engineer—Personnel, Dept. MP, BOEING AIRPLANE COMPANY, Seattle 14, Washington.

SOUTHERN CALIFORNIA plastics plant has openings for Tool Designer, Tool Estimator, and Production Specialists including Molding Room Foremen. Minimum 4 yrs. experience required. Please send resume to Box 2018, Modern Plastics.

CHEMIST
Old established manufacturer diversifying line by going into production of expandable polystyrene. Looking for qualified Chemist, preferably with knowledge of German, to head up operation and do some amount of related research work. Reply in full to Box 2041, Modern Plastics.

CHEMIST: With experience in high impact styrene and styrene-resin-rubber blends. To set up new extrusion and calendering department. Reply Box 2000, Modern Plastics.

(*Continued on page 284*)

FIBERGLAS
Reinforced
MOLDING COMPOUNDS

ALL THE PROPERTIES OF PLASTICS... PLUS!

+ Heat Resistance
+ Strength
+ Dimensional Stability

A cool 50% saving on refrigerator parts

Back in 1952, repeated laboratory failure of plastic strike plates designed for refrigerator doors led the Kelvinator Division of American Motors Corporation to switch to a Fiberglas-reinforced molding compound.

The new strike plate took 1,000,000 test slams—equal to 30 years of continuous usage—without visible fatigue. As a result, today's Kelvinator refrigerators and freezers contain *twenty-five* different Fiberglas-reinforced plastic parts in 46 structural locations, permitting economic savings of up to 50%.

The new parts are stronger, less expensive, more efficient than the metal, metal castings, phenolic laminates, cork, or un-reinforced plastic parts they replaced. What's more, their greater thermal efficiency prevents sweat patterns at freezing temperatures. They can't rust, corrode or hold odor.

On next year's models, more than a dozen *additional* parts will be molded with Fiberglas-reinforced plastics . . . Kelvinator, a big producer of the old wooden icebox, and the oldest maker of electric refrigerators, goes right on pioneering.

PRODUCT MANUFACTURER:
Kelvinator Division, American Motors Corporation
Grand Rapids, Michigan

MOLDER:
Kelvinator Division, American Motors,
Grand Rapids, Michigan, and
Camfield Manufacturing Company,
Grand Haven, Michigan

MOLDING COMPOUND:
Fiberglas-reinforced polyester

write to OWENS-CORNING FIBERGLAS T.M. Reg. Owens-Corning Fiberglas Corp.

Dept. 125-K, Textile Products Division, 598 Madison Ave., N. Y. 22, N. Y., for full list of suppliers

CLASSIFIED ADVERTISING

(*Continued from page 282*)

MATERIAL SALESMEN
We have openings for experienced plastics materials salesmen in several territories. Activities include sale of Virgin and Reprocessed molding powders and buying of scrap and surplus molding powders. Send complete resume and state salary requirements. All replies held in strict confidence.
A. BAMBERGER CORPORATION
703 Bedford Ave., Brooklyn 6, N. Y.

INJECTION MOLDER needs top notch man to handle first class tool shop, building molds and repairing molds. Reply Box 2023, Modern Plastics.

PLANT SUPERINTENDENT WANTED
Capable of setting up and taking full charge of plastic extrusion division. Excellent opportunities with fast growing midwest firm. Furnish complete resume. Replies treated confidentially. Reply Box 2004, Modern Plastics.

CHEMICAL MARKET RESEARCH: Our expanding consulting service to the chemical process industries means we have openings for young chemists and/or chemical engineers who are looking ahead. No market research training is necessary but some industrial experience is indicated plus an active interest in the economic and marketing phases of the chemical process industries. Obviously training or experience in market research would be valuable. ROGER WILLIAMS, Technical & Economic Services, Inc., 148 East 38th Street, New York 16, New York. MUrray Hill 5-5257.

COATING CHEMIST
Experienced in vinyl and lacquer formulating and coating for textile and paper plant in Virginia. Exceptional opportunity to man capable of assuming complete responsibility. Reply Box 2028, Modern Plastics.

ENGINEER SALES—ENGINEER POLYESTER RESINS: Knowledge of polyester resins and experience in reinforced plastics. Sales and/or Technical Service experience essential. College education with Chem. Engr., Chemistry, or Engineering major of at least 3 years required. Well established, growing California company interested in applicants for work in Southern California. Give education, employment experience and essential data first letter. Replies confidential. CHEMICAL PROCESS CO., Box 829, Redwood City, Calif.

COME TO TEXAS
We have permanent opportunities galore for injection molding plant personnel—plant engineer, assistant plant superintendent, foremen, machine operators, maintenance men, set-up men. Inquire about foreman training program. Our employees know about this ad.
LOMA PLASTICS, INC.
P. O. Box 11277
Fort Worth, Texas

DESIGNING ENGINEER
Chicago injection molding company requires an experienced designer of molds, capable of working with production department on initial run of new molds, scheduling of proper maintenance and mold modifications with plant and outside shops. Excellent opportunity. Send complete resume to the AMERICAN PLASTICRAFT COMPANY, 814 North Sacramento Blvd., Chicago 22, Illinois. Attention: H. Donatelli.

WANTED TECHNICIAN: With good experience in manufacture and formulating of Resin Bonded Abrasive Wheels for Laboratory and Methods. Experience in Resinoid Diamond Wheels preferred. Applicants with thorough knowledge of plastics theory and practice please give full details. Will also consider man with extensive experience on consultant basis. Permanent position. Reply Box 2019, Modern Plastics.

MOLDING FOREMAN: Medium-sized compression molding plant in Chicago, Ill. Night shift 12M to 8 A.M. Must have ability to set up molds. Reply Box 2015, Modern Plastics.

WANTED
Young, aggressive chemical engineer experienced in acrylic plastics, between ages of 25 to 35. Excellent opportunities. Replies treated confidentially. Reply Box 2003, Modern Plastics.

PLASTICS ENGINEER: For large, northeastern custom molder of thermoplastics. Should be a graduate in mechanical engineering. Age —Between thirty and forty-five. Must have had supervisory experience in plastic mold design construction and operation. Working knowledge of all thermoplastic materials is required. Send complete resume with past salaries and desired salary. Reply Box 2017, Modern Plastics.

LARGE INJECTION MOLDER of Housewares needs top grade mold designer to design molds. Reply Box 2022, Modern Plastics.

EXPANDING PLASTIC PLANT seeking an experienced extrusion foreman with knowledge of custom extrusion, die design, and set up. Please state personal background, experience and salary requirements. Good opportunity for advancement. Reply Box 2025, Modern Plastics.

MOLD DESIGNER
Large injection plastic molder in midwest desires Mold Designer with primary experience in designing injection molds. Some assembly fixture work. Must have experience in this field. Reply Box 2008, Modern Plastics.

PLANT SUPERINTENDENT for custom injection molding plant. Must be experienced in most thermoplastic materials and thoroughly know molding equipment. We are specifically looking for someone who has had successful experience supervising molding of industrial parts as well as parts for the refrigerator, radio, and television industries. Some knowledge of finishing operations desirable. This is a valuable opportunity to work in an exceptionally modern and well-equipped injection molding plant with capacity totalling over 100 ounces. Reply Box 2042, Modern Plastics.

MOLDING TECHNOLOGIST
Molding development laboratory of large Eastern raw materials supplier requires services of technologist with minimum five years' experience in injection and compression molding, mold design and product application on wide variety of raw materials. Supervisory experience desirable. Duties include new product application, customer field service and supervision of molding shop. New York metropolitan area. Please submit complete details. Reply Box 2014, Modern Plastics.

TOOL ROOM FOREMAN
Large midwest plastic injection molder requires Tool Room Foreman for ten man mold maintenance shop. Good background of experience required. Reply Box 2009, Modern Plastics.

LARGE INJECTION MOLDER located in New England offers real opportunity to a man who knows injection molding of styrene and polyethylene. Must understand materials and how they perform under heat, pressure and cooling. Reply Box 2021, Modern Plastics.

PLASTICS PRODUCTION SUPERINTENDENT: Solidly established company, pioneer in the plastics industry, has opening for qualified man to head up newly formed sheeting & film division. Requires thorough experience in sheeting and film extrusion; injection molding, calendered sheeting and sheet polishing experience desirable. Location: attractive eastern Mass. community. Write complete details, including salary requirements. Reply Box 2038, Modern Plastics.

WANTED
Thermosetting Plastics Engineer for laboratory and sales development.
CONSOLIDATED PAPER COMPANY
Plastics Division
Monroe, Michigan

WANTED
Laminating Department Manager desired for well-known plant in Ohio. Must have experience in polyester fiberglas production. State salary desired and give references. Reply Box 2016, Modern Plastics.

LARGE Eastern Plastics Manufacturer wants to hire the best Sales Manager available for Consumer Products through regular sales channels. We want an experienced producer with sound ideas who wants good pay and opportunity. Reply Box 2031, Modern Plastics.

MOLD DESIGNER: Capable of designing complicated injection molds, for plastic or wax injection for use in the investment casting process. Attractive position with the leader in this field. Modern plant located in the lake region of New Jersey. Please send resume or apply to AUSTENAL LABORATORIES, INC., Roy Street and Rockaway Road, Dover, N. J.

ENGINEERS FOR PLASTIC EXTRUSION
Outstanding opportunities for engineers in new plastic extrusion and vacuum forming operations with a company that is making a vast expansion in all phases of the plastics field. Mechanical Engineer for tool development and Production Engineering. Chemical Engineers for product and process development. Design Engineer for design of production equipment. Prefer men under 35 with 3-10 years experience; however, will consider new graduates.
ST. REGIS PAPER CO.
Panelyte Division, 660 South "L" St.,
Richmond, Indiana.

SITUATIONS WANTED

YOUNG AGGRESSIVE EXECUTIVE with experience in polyethylene film extrusion seeks position. Will invest in satisfactory proposition. Age 28, B.S. in Business Administration. Reply Box 2035, Modern Plastics.

CHEMICAL ENGINEER: 8 years of plastic and industrial coatings experience. Extrusion, formulating, product development, color matching, machine design and layout work, electrical circuits. Line supervision, personnel relations, technical service and sales liaison work, trouble shooting. Would like to apply diversified and versatile background to a sales or technical service position with a growing organization. Reply Box 2001, Modern Plastics.

PROPRIETARY SALES MANAGER AVAILABLE: Wide knowledge of Plastic Housewares, Toys, Gifts and Advertising Specialty fields. Can develop new proprietary division or head existing department—know chain, jobber, dept. store distribution. Proven record of accomplishment. Excellent Background in Sales Mgt., Promotion and Administration. Harvard Business School—Married, Age 38, will relocate. Reply Box 2037, Modern Plastics.

SALES AGENTS WANTED

EARN MORE MONEY if you are calling on extruders. Here is a line easy to sell. We manufacture anything related to extrusion. Flat sheeting die and take up, Extruders, blown film die and wind up, wire covering, special or replacement screws, monofilaments, small or large automatic spoolers, conveyors, etc. Good commission—some territories still open. R. D., 78-21 Queens Blvd., Elmhurst, L.I., N.Y.

(*Continued on page 285*)

CLASSIFIED ADVERTISING

(*Continued from page 284*)

WANTED
Manufacturer's representative, by machine manufacturer selling to the vinyl Plastic Industry. We are interested only in man or organizations of proven ability who are now calling on fabricators of vinyl plastic materials. Several territories open. Reply Box 2030, Modern Plastics.

SALES AGENTS WANTED: Sales Representatives wanted by Injection Molder and Decorator. Our custom line includes decorative emblems for automotive field, nameplates, knobs, etc. for refrigeration and appliance industry, also some proprietary items. We require men of proven ability, now calling on Industrial Accounts in Indiana, Ohio, Kentucky and the eastern states. Reply giving experience, territory, and present accounts. Reply Box 2032, Modern Plastics.

MANUFACTURERS REPRESENTATIVES now calling on injection molders wanted by Eastern manufacturer of top quality regular and impact polystyrenes. Commission basis. Many territories open. Reply stating territory covered, lines now carried, experience. Reply Box 2029, Modern Plastics.

TECHNICAL SALES—PLASTICS: Precision vacuum forming and fabricating firm of thermoplastic sheeting desires manufacturers representatives. Excellent opportunity in New York City, Long Island and northern New Jersey territory. Strict commission plus expense account. Write giving lines carried to DURABLE FORMED PRODUCTS, INC., 6 Greene Street, New York 13, New York.

MISCELLANEOUS

WANTED
INJECTION MOLDING BUSINESS
We will purchase injection molding plant, small or medium size. Proprietary items preferred. Location immaterial. Reply Box 2006, Modern Plastics.

NEW PRODUCT PATENT & Design available —Salable to 25 million boot wearers: Requires ½ sq. ft.—.08" sheet in two pieces per unit. Sells in pairs. Excellent patent for sale or exclusive license. Reasonable fee for try-out period to responsible mfg. Descriptive brochure upon request. H. B. MANN, M.E., 805 Bessemer Bldg., Pittsburgh 22, Pa.

LULING, TEXAS
Population 6500
This South Texas City presents unusual opportunity for establishment of Plastics Manufacturing Plant. Conveniently located near raw materials and to fast growing trade area. Situated on three major highways and Southern Pacific Railroad. Attractive tax and utility rates. Good labor conditions. Good churches; schools and recreational facilities. Write
LULING CHAMBER OF COMMERCE, Luling, Texas

BABY ITEMS: Wanted to buy, assemble and sell. We have nationwide distribution in this field. Reply Box 2039, Modern Plastics.

WANTED
PLASTIC BUSINESS
We will buy for expansion purposes small or medium size plastic business. Will consider extrusion, injection molding, and vacuum molding. Location not important. Reply Box 2007, Modern Plastics.

MANUFACTURERS,
SELL TO US!
Our business is selling business gifts and advertising specialties and calendars to America's businessmen. We're a 79-year-old firm, with an AAA-1 financial rating, and we're in the market for NEW products to offer our customers. Are you now manufacturing something suitable for our 500-man sales force to offer as a business gift? Or do you have a product that would make an advertising specialty? Only two restrictions —1, the product must not have been previously offered to the advertising specialty field; 2, the product must have room for imprints. Send full details to William Allen, vice president, KEMPER-THOMAS, Cincinnati 12, Ohio.

All classified advertisements payable in advance of publication

Closing date: 28th of the second preceding month, e.g., Oct. 28th for Dec. issue.

Up to 60 words $10.00	Up to 120 words $20.00	Up to 180 words $30.00
Up to 60 words (boxed) $20.00	Up to 120 words (boxed) $40.00	Up to 180 words (boxed) $60.00

for further information address Classified Advertising Department, Modern Plastics, 575 Madison Avenue, N. Y. 22, N. Y.

MOSLO MACHINERY COMPANY

SPECIALISTS

in the manufacture of high speed, plastic injection molding machines in the 2 and 3 ounce size.

See Us Before You Buy

The best way to convince yourself of the merits of a Moslo machine is to see it operate. We invite you to visit our plant and we will gladly make a demonstration using your molds.

MOSLO MACHINERY COMPANY

2437 PROSPECT AVENUE • CLEVELAND 15, OHIO

INDEX OF ADVERTISERS

NOVEMBER, 1955

Accurate Molding Corp. 170
Acheson Dispersed Pigments Co. 27
Aeromack Company, The 212
Advance Solvents and Chemical Corp. 275
Allen, Alva F. 242
Allied Chemical Dye Corporation
Barrett Division 173
National Aniline Division . 55, 227
Nitrogen Division 211
Almac Plastics 198
American Agile Corporation 57
American Cyanamid Company, Plastics and Resins Division .. 143
American Gas and Electric Company 34
American Insulator Corporation . 185
American Molding Powder and Chemical Corporation 279
American Resin Corp. 168
Amos Molded Plastics 30
Angier Products 63
Anorgana G. M. B. H. 196
Archer-Daniels-Midland Company 81
Argus Chemical Corporation ... 195
Auburn Button Works, Inc. 192
Auto-Vac Company 24
Avery Adhesive Label Corp. 199

Bailey, R. N., & Co., Inc. 184
Bakelite Company, A Division of Union Carbide and Carbon Corporation 153-155
Baker Brothers, Inc. 53
Bamberger, A., Corporation 278
Barber-Colman Company, Wheelco Instruments Division 160
Barrett Division, Allied Chemical & Dye Corporation 173
Battenfeld 16
Bolling, Stewart, & Company, Inc. 209
Boonton Molding Co. 29
Borden Company, The, Chemical Division 62
Borg-Warner Corporation, Marbon Chemical Division 64
Bridgeport Moulded Products, Inc. 68

Cabot, Godfrey L., Inc. 139
Cadillac Plastic and Chemical Co. 7
Callanan, J. A., Company 289
Cambridge Instrument Co., Inc. . 242
Cameron Machine Company 181
Carbide and Carbon Chemicals Company, A Division of Union Carbide and Carbon Corporation 156
Carver, Fred S., Inc. 225
Catalin Corporation of America . 1
Cavagnaro, John J. 196
Celanese Corporation of America Plastics Division .. 32, 33, 230, 231
Chemical Industries Exposition . 212
Chemical Products Corporation . 208
Chemore Corporation 269
Chicago Molded Products Corp., Campco Division 4
Ciba Company Inc., Plastics Division 253
Claremont Pigment Dispersion Corp. 233
Classified 280, 282, 284, 285
Columbia Mills, Inc., The 277
Comet Industries 166
Conforming Matrix Corporation . 208
Consolidated Vacuum Corporation 80
Continental Carbon Company ... 270
Continental-Diamond Fibre Division of the Budd Company, Inc. 217
Continental Oil Company, Petrochemical Department 20
Crompton Richmond Company Incorporated 194
Crucible Steel Co. of America .. 273
Cumberland Engineering Company Inc. 6

Detroit Macoid Corporation 246
Detroit Mold Engineering Co. .. 192
Detroit Stamping Company 252
Diamond Alkali Company, Plastics Division 290
Diemolding Corporation 234
Dow Chemical Company, The 36, 37
Dowding & Doll Ltd. 141
duPont de Nemours, E. I., & Co. (Inc.)
Electrochemicals Department . 71
Film Department 223
Polychemicals Department 10, 11
Durez Plastics Division, Hooker Electrochemical Company Inside Front Cover

Eagle Tool and Machine Co. 184
Eastman Chemical Products, Inc. 83, 129, 167, 225, 249, 259
Eastman Machine Co. 204
Egan, Frank W., & Company ... 72
Electric Auto-Lite Company, The, Instrument and Gauge Division 216
Electro-Technical Products, Division of Sun Chemical Corp. . 163
Elgood Materials Corporation .. 249
Emery Industries, Inc. 41
Enjay Company, Inc. 137
Erdco Engineering Corp. 180
Erie Engine & Mfg. Co. 200
Erie Resistor Corporation, Erie Plastics Division 66
Ever Ready Label Corporation .. 197
Exact Weight Scale Co., The 174

Farrel-Birmingham Co., Inc. 35
Ferro Chemical Corporation 58
Ferro Corporation, Fiber Glass Division 248
Firestone Plastics Company 45
Flexfirm Products 265
Food Machinery and Chemical Corporation, Ohio-Apex Div. . 206
Formvac Corporation, A Division of Welding Engineers, Inc. ... 116
Foster Grant Co., Inc. 147

G. M. C. Process Corp. 258
Gaylord Container Corporation . 205
Geissel Mfg. Co., Inc. 201
General Electric Company Back Cover
General Mills, Chemical Division 60, 61
General Research & Supply Co. . 188
General Tire & Rubber Co., The, Chemical Division 73
Gering Products, Inc. 187, 207
Glass Yarns and Deeside Fabrics Ltd. 82
Glidden Company, The, Chemicals-Pigments-Metals Division . 287
Gomar Manufacturing Company 254
Goodrich, B. F., Chemical Co. .. 3, 84
Goodyear Tire & Rubber Company, The 14, 15
Grauert, Ralph W., Inc. 214

Harchem Division, Wallace & Tiernan, Inc. 220
Harrington & King Perforating Co., The 277
Harshaw Chemical Co., The 240
Hendrick Mfg. Corp. 164
Hercules Powder Company 56
Hexcel Products Inc. 169
Heyden Chemical Corporation .. 43
Hinde & Dauch 127
Hollander, Allen, Co., Inc. 218
Hooker Electrochemical Co. 9
Durez Plastics Division Inside Front Cover
Hull-Standard Corporation 235
Hyde, A. L. 225
Hydraulic Press Manufacturing Co., The 21

Imperial Chemical Industries Limited 161
Improved Machinery Inc. 251
Independent Die & Supply Co. .. 174
Industrial Heater Co., Inc. 174
Industrial Mfg. Corp. 204
Industrial Research Laboratories 228
Injection Molders Supply Co. 44, 289

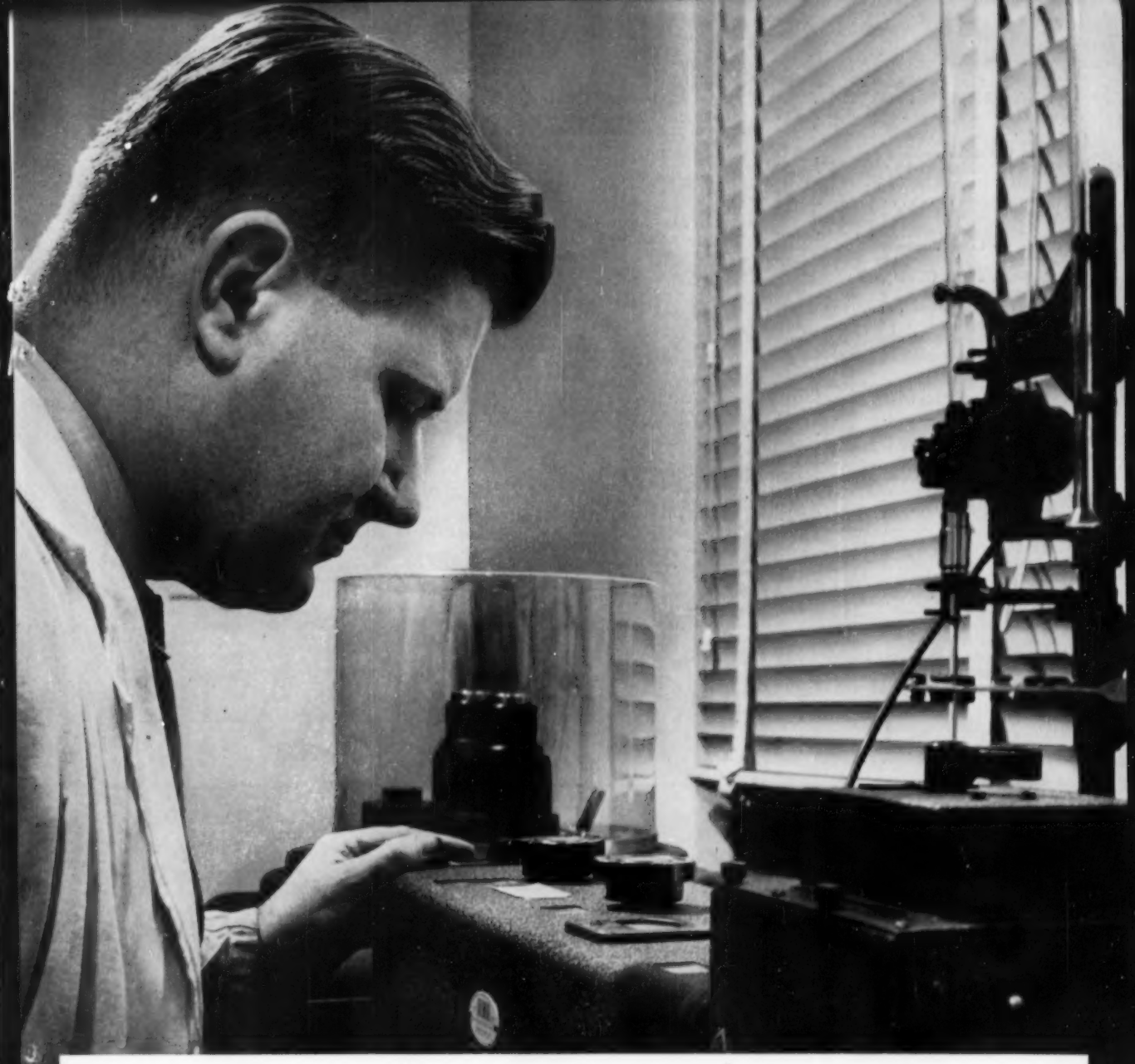
Kabar Manufacturing Corporation 206
Kaumagraph Company 167
Kentucky Color and Chemical Company, Inc. 252
Kingman, E. B., Co., Inc. 250
Kingsley Stamping Machine Co. . 192
Kleen-Stik Products, Inc. 213
Koppers Company, Inc. 183
Kurz-Kasch, Inc. 17

L-O-F Glass Fibers Company 210
Lane, J. H., & Co., Inc. 201
Lembo Machine Works, Inc. 50
Lester-Phoenix, Inc. 31
Lewis Welding & Engineering Corp. 67
Liberty Machine Co. Inc. 162
Logan Engineering Co. 59

Machine Factory and Foundry Ltd. 212
Mack Molding Company, Inc. .. 214
Manco Products, Inc. 187
Manufacturers' Literature . 221, 222
Marblette Corporation, The 132
Marbon Chemical, Division of Borg-Warner Corporation 64
Markem Machine Company 202
Marvel Engineering Company .. 215
Mayflower Electronic Devices Inc. 194
Metalsmiths, Div. of Orange Roller Bearing Co., Inc. 234
Metasap Chemical Company 236
Michigan Chrome & Chemical Co. 216
Midwest Plastic Products Company 289
Miller Fluid Power Co. 28
Mitts & Merrill 186
Modern Plastic Machinery Corp. 13
Monsanto Chemical Company Organic Chemicals Division 69, 149
Plastics Division 238, 239, 261
Montan Export, Inc. 259
Mosinee Paper Mills Company .. 151
Moslo Machinery Company 285
Mt. Vernon-Woodbury Mills 51
Muehlstein, H., & Co., Inc. 25

National Aniline Division, Allied Chemical & Dye Corp. 55, 227
National Lead Company 49
National Rubber Machinery Co. 76, 77
Naugatuck Chemical . 135, 256, 257
Newbury Industries 38
Nitrogen Division, Allied Chemical & Dye Corporation 211
Nixon Nitration Works 39
Northern Industrial Chemical Co. 164
Norton Laboratories, Inc. 241

Ohio-Apex Division, Food Machinery and Chemical Corp. .. 206



This color "fingerprinter" can't be fooled!

Production samples of Glidden chemical compounds must pass the rigid "fingerprint" test of the Spectrophotometer. Each compound has its own absorption spectra which must match the master sample. This method of testing is the most accurate known for color consistency and particle uniformity.

This exacting test is one of many in the Glidden Quality Control program that assures you of the finest pigment available, whether it be ZOPAQUE Titanium Dioxides; CADMOLITH Reds and Yellows; or SUNOLITH Lithopones. Write now for detailed information.

THE GLIDDEN COMPANY

Chemicals • Pigments • Metals Division

Baltimore, Maryland · Collinsville, Illinois · Hammond, Indiana · Scranton, Pa.

CHEMICALS
PIGMENTS
METALS

QUALITY
Glidden
PRODUCTS

Orange Roller Bearing Co., Inc., Metalsmiths Div. 234
Owens Corning Fiberglas Corp. . 283

Pantex Manufacturing Corp. ... 167
Paterson Parchment Paper Co. .. 224
Peco Machinery Sales (Westminster) Ltd. 70
Peerless Roll Leaf Company, Inc. 219
Peter Partition Corp. 165
Pittsburgh Coke & Chemical Co. Inside Back Cover
Pittsburgh Plate Glass Company, Selectron Products Division .. 203
Plandex Corporation 200
Plastic Materials, Inc. 232
Plastic Molding Corporation 204
Plastics Engineering Company .. 23
Plating Engineering Co. 170
Porter, H. K., Company, Inc., The Watson-Stillman Company Division 145
Pratt & Whitney 47
Preis, H. P., Engraving Machine Co. 250
Price-Driscoll Corporation 188
Projectile & Engineering Company Ltd., The 70

Radio Receptor Company, Inc. .. 65
Raybestos-Manhattan, Inc., Asbestos Textile Division 22
Reed-Prentice 8
Reifenhauser, A. 42
Rohm & Haas Company
Plastics Department 19
The Resinous Products Division 79
Royle, John, & Sons 249
Rubber Corporation of America . 191

Safety Car Heating and Lighting Company, Inc., The 237
Sarco Company, Inc. 208
Schulman, A., Inc 288
Schwartz Chemical Co., Inc. 245
Scranton Plastic Laminating Corp. 180
Sealomatic Electronics Corp. 197
Seiberling Rubber Company, Plastics Division 78
Servospeed 255
Shell Chemical Corporation 179
Simplomatic Mfg. Co. 164
Sinko Manufacturing & Tool Co. 216
Society of Plastics Engineers .. 191
Socony Mobil Oil Company, Inc. 245
Spencer Chemical Company 52
Standard Tool Company 190
Stanley Chemical 226
Stensgaard, W. L., and Associates, Inc. 187
Stokes, F. J., Machine Co. 123
Stricker-Brunhuber Corp. 196
Sun Chemical Corporation, Electro-Technical Products Div. .. 163
Swift, M., & Sons, Inc. 186
Sylvania Electric Products Inc. .. 48

Textile Banking Co., Inc. 46
Thermaflow Chemical Corp. 258
Thermo Electric Co., Inc. 188
Thomas Publishing Company ... 206
Thoreson-McCosh Inc. 162
Timken Roller Bearing Company, The 171
Tinnerman Products, Inc. 243
Transilwrap Company 12
Tupper Corporation 26
Turner Halsey Company 51

Union Carbide & Carbon Corporation Bakelite Company Division 153-155 Carbide and Carbon Chemicals Company Division 156
Union City Filament Corp. 228
U. S. Industrial Chemicals Co. .. 247
U. S. Rubber Company (Royalite) 54

Vacuum Forming Corp. 281
Van Dorn Iron Works Co., The . 177
Vogt Manufacturing Corp. 214

Wallace & Tiernan, Inc., Harchem Division 220
Waterbury Companies, Inc. 194
Watertown Manufacturing Co., The 189
Watlow Electric Mfg. Co. 232
Watson-Standard Co. 193
Watson-Stillman Company, The, Division of H. K. Porter Company, Inc. 145
Welding Engineers, Inc., Formvac Corporation Division 116
Wellington Sears Company 18
West Instrument Corporation .. 229
Westchester Plastics, Inc. 175
Wheelco Instruments Division, Barber-Colman Company 160
Whitlock, C. H., Associates 165
Wiegand, Edwin L., Company .. 40
Windsor, R. H., Ltd. 74
Witco Chemical Company 270
Worbla Ltd. 75
Worcester Moulded Plastics Co. . 159
Wysong and Miles Company 191

MODERN PLASTICS

575 MADISON AVENUE • NEW YORK 22, N.Y.

Your Key to Greater Savings

YOU CAN SAVE MONEY ON THESE PLASTICS.....

Polyethylene

Ready for extrusion or ejection molding

and Vinyl

We are in a position to save you money on the EXACT type of plastic you want. Just let us know your needs. Our years of experience are at your service — helping you keep production and quality up — while costs go down.

Samples Mailed on Request

A. Schulman Inc.

NEW YORK CITY 460 Park Ave. MUrray Hill 8-4774
AKRON, OHIO 790 E. Tallmadge HEmlock 4-4124
BOSTON, MASS. 738 Statler Bldg. Liberty 2-2717
E. ST. LOUIS, ILL. 14th & Converse BRidge 1-5326
Offices in ENGLAND, GERMANY and JAPAN

3 QUESTIONS TO ASK BEFORE YOU BUY AN ELECTRONIC SEALER

- **Are all electronic sealers alike?**
  Basically, yes; specifically, no. They are alike in that they consist of a generator and press. They differ in their engineering, safety features, cost, ease of operation, and frequency of repair.

- **What proof can I get of a sealer's reliability?**
  Callanan will show you letter after letter from satisfied users proclaiming efficient trouble-free operation, the result of using only highest grade, heavy duty components.

- **Who will install the equipment I buy?**
  Wherever you are, if you buy "Callanan" it will be installed and certified "in operation" by Callanan's own electronic engineers. You will not have to rely on confusing "do it yourself" diagrams or pinch-hit sales representatives.

Write today for descriptive folder.

J. A. CALLANAN COMPANY

118 SO. CLINTON STREET • CHICAGO 6, ILL.

Callanan

Make Certain It's GENUINE

IMS Silicone Spray MOLD RELEASE

It Isn't Size—It's Quality That Counts!

EXCLUSIVE ALL-METAL
FAST-ACTING SPRAY HEAD
ENDS FUMBLING,
SPEEDS APPLICATION,
SAVES CYCLE TIME!

DELIVERED PRICES

Single Can	$2.00
Unbroken Dozen	$18.00
Unbroken Gross	$197.40

Lower prices on larger orders shipped on your schedule as needed.

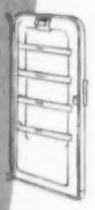
(Molders who've tried them all always specify IMS Silicone Spray!)

REMEMBER
PREPAID SAME DAY SHIPMENT

INJECTION MOLDERS SUPPLY CO.
3514 LEE ROAD • WYoming 1-1424 • CLEVELAND 20, OHIO

YOU CAN SAVE BY SWITCHING TO MIDLON

If your plastic costs are excessive . . . check with Midwest, the nation's largest and oldest exclusive extruder of thermoplastic sheet.



Here at Midwest, specialization has paid off . . . not only in quality of product but also in lowered costs. This experience coupled with volume has saved thousands of dollars for many Midwest customers.

Price, quality or service . . . whatever your problem in plastics . . . there is a Midlon sheet to fit your needs precisely. That is why "Midlon or equal" so often appears in the specification sheets of major manufacturers.

Price and product information furnished promptly upon request.

MIDWEST
PLASTIC PRODUCTS COMPANY
1801 CHICAGO RD., CHICAGO HEIGHTS, ILL.

Chemicals you live by **USE**

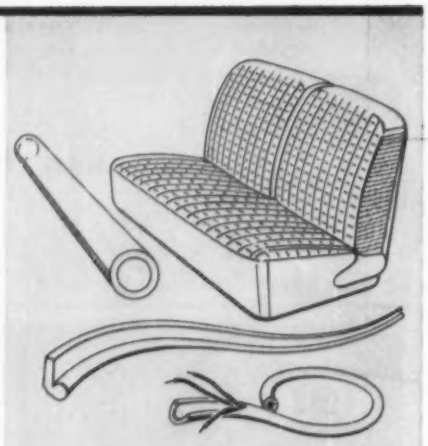
Diamond Vinyl Resins for high quality, high speed processing

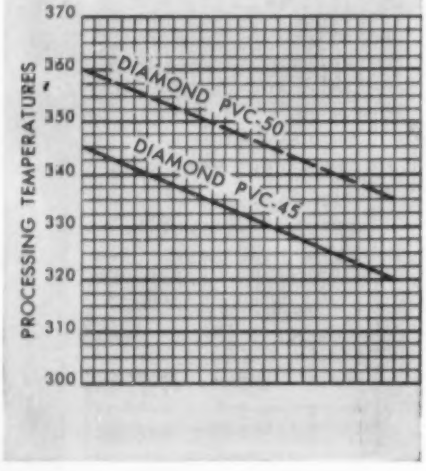
DIAMOND PVC-50—An outstanding general purpose resin especially well suited for profile extrusions, garden hose, thin film and wire insulation. PVC-50 has been accepted for use in all UL listed vinyl electrical compounds. It produces films and extrusions of exceptional clarity; dry blends rapidly and has the advantages of high bulk density, freedom from gel particles and good heat stability.

DIAMOND PVC-45—This newer DIAMOND resin is ideal for the production of film, sheeting and rigid and semi-rigid extrusions. PVC-45 has a unique combination of characteristics, all contributing to easier processing. These include low temperature calendering, easy dry blending, freedom from gel particles, high bulk density and good heat stability.

* * *

For information on DIAMOND PVC resins and technical co-operation, write DIAMOND ALKALI COMPANY, Plastics Division, 300 Union Commerce Building, Cleveland 14, Ohio, or your nearest DIAMOND Sales Office.





SALES OFFICES

Cincinnati 29, Ohio	4701 Paddock Road
Chicago 6, Illinois	20 North Wacker Drive
Cleveland 13, Ohio	633 Penton Building
Houston 2, Texas	1006 Main Street
Memphis 3, Tennessee	1381 Heistan Place
New York 16, New York	99 Park Avenue
Philadelphia 7, Pa.	12 South Twelfth Street
Pittsburgh 22, Pa.	1323 Oliver Building
St. Louis 8, Missouri	4246 Forest Park Blvd.

DIAMOND ALKALI CHEMICALS

Diamond Chemicals

IF you're looking for an economical vinyl plasticizer for formulations that require very low volatility and good permanence, order Pittsburgh PX-120 (DiIso Decyl Phthalate). Vinyl products made with this latest addition to Pittsburgh's broad family of phthalate plasticizers are characterized by long life, a high degree of resistance to extraction by various materials and good low temperature properties. And the low specific gravity of Pittsburgh DIDP may enable you to make appreciable savings in your formulating costs.

This favorable combination of properties makes Pittsburgh PX-120 especially suitable for manufacturing sheeting, flooring, coated fabrics, vinyl sponge, and extruded products such as refrigerator gaskets, shoe welting and electrical jacketing.

We'll gladly send you specifications and other technical information about Pittsburgh DIDP. *Write today for Bulletin 120.*

PITTSBURGH *Job-Rated* PLASTICIZERS

PX-104 DiButyl Phthalate
PX-108 DiIsoOctyl Phthalate
PX-114 Decyl Butyl Phthalate
PX-118 IsoOctyl Decyl Phthalate
PX-120 DiIso Decyl Phthalate
PX-138 DiOctyl Phthalate
PX-208 DiIsoOctyl Adipate
PX-209 DiNonyl Adipate
PX-220 DiIso Decyl Adipate
PX-238 DiOctyl Adipate
PX-404 DiButyl Sebacate
PX-438 DiOctyl Sebacate
PX-800 Epoxy
PX-917 TriCresyl Phosphate

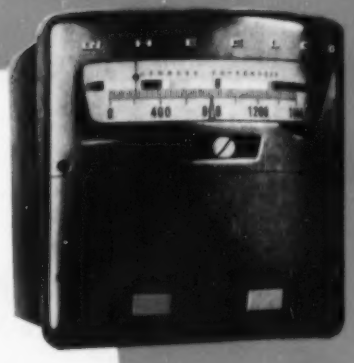
PLASTICIZER DIVISION
PITTSBURGH
COKE & CHEMICAL CO.
Grant Building · Pittsburgh 19, Pa.

W&D 5569

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

"FAST CURE... even with heavy sections"

...through G.E.'s new 12900 Black general-purpose phenolic molding compound



That's what Wheelco Instruments Division* reports! Wheelco uses General Electric 12900 Black to mold covers for Series 400 Capacitrols. Besides fast cure, Wheelco benefits by the way G-E 12900 provides a good-looking, high-gloss finish!

*Barber-Colman Company, Rockford, Ill.

General Electric's new 12900 Black and 12901 Brown are among the fastest-curing and most versatile phenolic materials on the market today. Suitable for cold powder as well as preheat applications, these high-density powders result in uniform pill weight, fast cures, and rigid set. Where can *you* use them to increase output, lower production costs and mold high-quality, attractive plastic parts?

For more information on G-E general-purpose molding compounds, just write to General Electric Company, Section 521-6A, Chemical Materials Department, Pittsfield, Mass.

Progress Is Our Most Important Product

GENERAL ELECTRIC